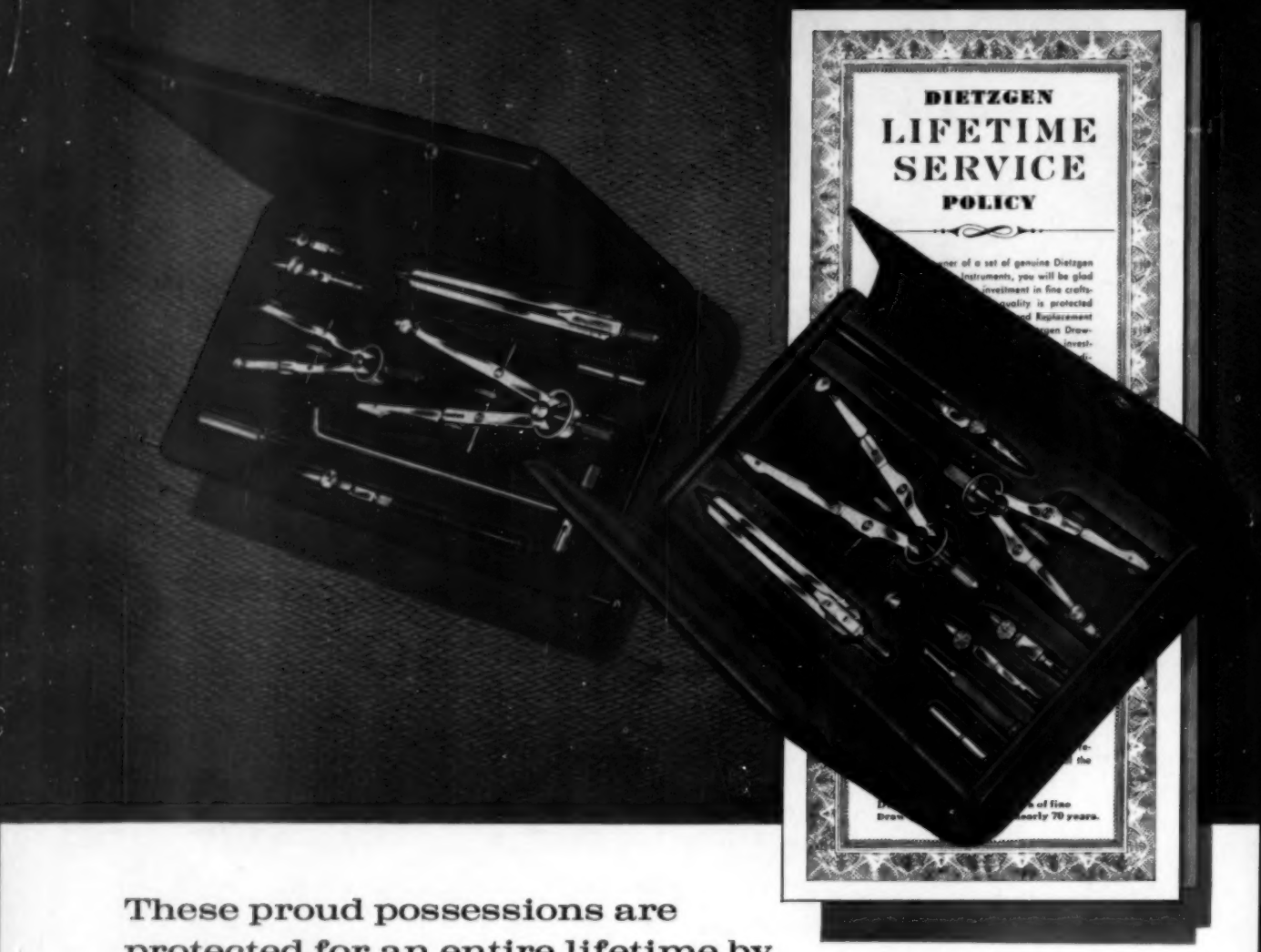
Volume 48, No. 6 June, 1959

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION



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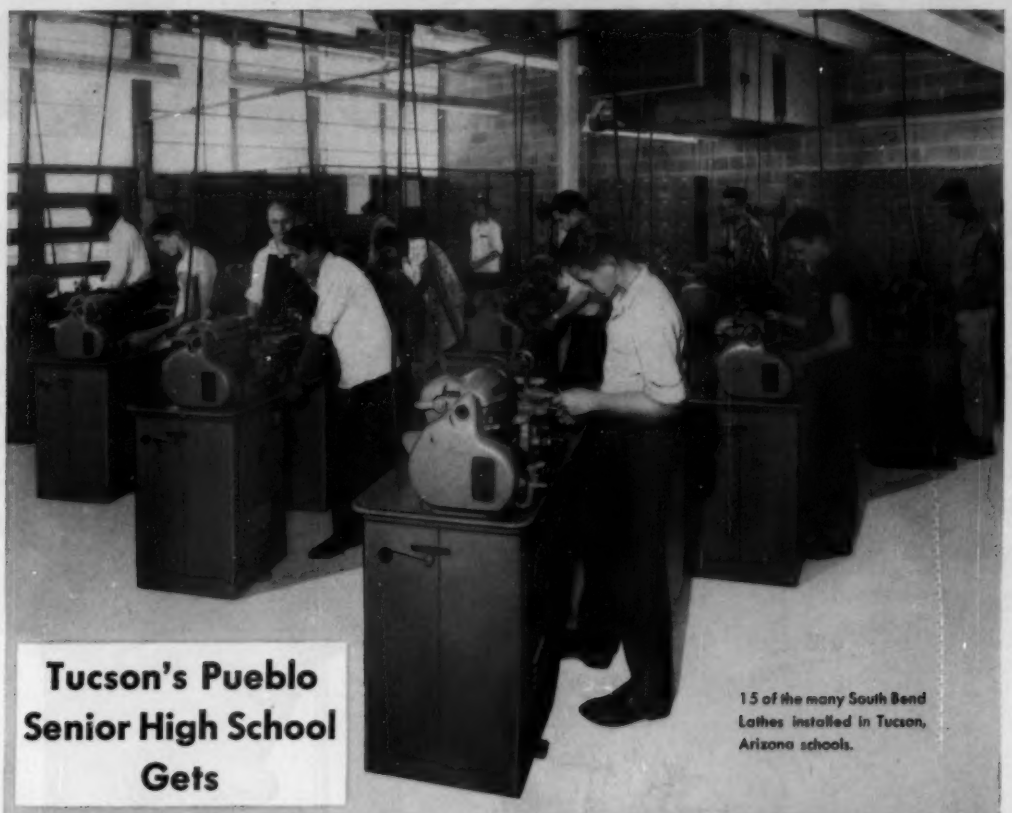

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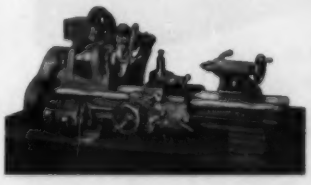

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JUNE
1959

VOL. 48 NO. 6

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 232 Broadway, New York 7, N. Y.

This Month's Cover

The photograph used on this month's cover shows Robert Sandin, teacher, with projects made at Tucson Senior High School, Tucson, Ariz.

Photo made by Allan Kramer and submitted by Harry A. Goldstein, A.P.S.A., teacher in the graphic arts department at Tucson Senior High School.

Your New Address

If you intend to change your home or school address during the coming summer, kindly remember to notify our circulation department, so that you will not fail to receive your copies of the magazine during the coming school year. When sending us your change of address, kindly include your old address, and be sure to add the new zone number also.

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Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

May 31–June 5. Wyoming Vocational Agriculture Teachers Association, at Jackson, Wyo. Secretary, Clark Allen, Cheyenne, Wyo.

June 8–12. Idaho Vocational Association, at Idaho State College, Pocatello, Idaho. President, Mrs. Helen Morgan, Burley, Idaho.

June 23–25. Pennsylvania Vocational Association, at Eagles Mere, Pa. Robert Sauter, Fairview, Malvern R.D. No. 2, Pa., or Robert E. Evans, Bradford County Schools (Court House), Towanda, Pa.

Aug. 13–15. Louisiana Vocational Association, at Capitol House, Baton Rouge, La. James B. Bynum, 2125 Avenue P, Huntsville, Tex., or W. J. Parent, P.O. Box 4064, State Capitol, Baton Rouge, La.

IGAEA ANNUAL CONFERENCE

The 34th Annual Conference on Printing Education will be held at the University of Colorado, Boulder, Colo., during the week of July 19 to 25, 1959. The theme of the conference is "Creative Teaching Through Graphic Arts Layout and Design."

train with safety!

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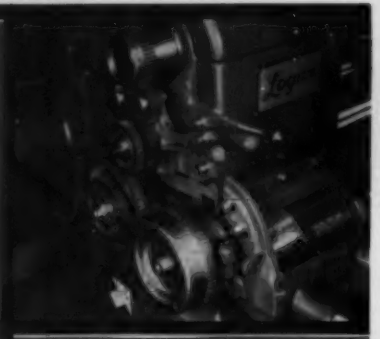

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NEW ENGLAND I.A. TEACHERS ASSOCIATION

The twenty-second annual convention of the New England Industrial Arts Teachers Association will be held at the Hotel Taft, New Haven, Conn., on November 6 and 7, 1959.

EASTERN CONNECTICUT I.A. ASSOCIATION

The first meeting of the newly formed Eastern Connecticut Industrial Arts Association was held on Thursday, April 9, 1959, at Windham Regional Technical School, Willimantic, Conn.

The E.C.I.A.A. area represents 104 industrial arts teachers from 33 school systems east of the Connecticut River.

Emmett O'Brien, director of the Division of Vocational Education, Connecticut State Department of Education, was the guest speaker. The topic of his talk was "Implications of Technical Education for Eastern Connecticut."

Officers of the association are: president, Thomas Flanders of Moodus; vice-president, George Williamson of Stonington; secretary, Normand Methot of New London; and treasurer, Leo Bilodeau of Storrs, Conn.

AMERICAN WELDING SOCIETY

The American Welding Society will hold their fall meeting in the Sheraton-Cadillac Hotel, Detroit, Mich., on September 28 through October 1, 1959.

Sixteen sessions will be held and a total of 48 technical papers will be presented.

American Welding Society, 33 W. 39 St., New York 18, N. Y.

PSI CHAPTER OF IOTA LAMBDA SIGMA

The winter banquet and initiation of the Psi Chapter of Iota Lambda Sigma was held at Southern Illinois University on January 31, 1959. Four new members were formally initiated and welcomed into Psi Chapter.

Chapter Officers and Initiates: front row, left to right — Charles Doty, vice-president; Wayne Ramp, president; John Erickson, faculty advisor; Robert Bishop, secretary-treasurer.

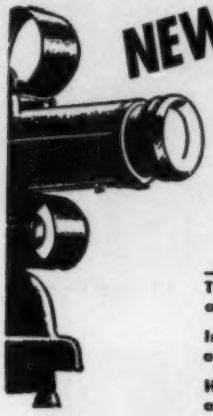
Second row — Harold Frazier; Gene Miller; Shelby Shake; Ernest Felty; and Kenneth Hansson.

The new student members are: Harold Frazier, Gene Miller, Ernest Felty, and Kenneth Hansson.

Shelby Shake, assistant professor of industrial education at Southern Illinois University, was presented with a life membership card.

(Continued on page 12A)

STANLEY SHOP TALK



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		How to Select a Screw Driver	11
How to Use Hammers and Nail Sets	28	How to Use the Screw Driver	24
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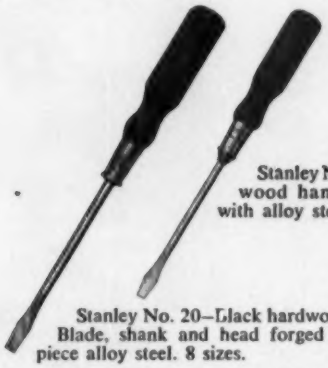

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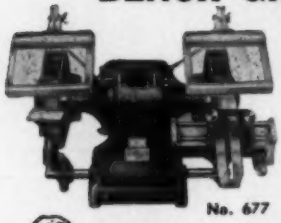

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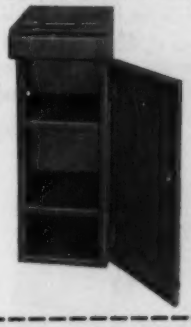

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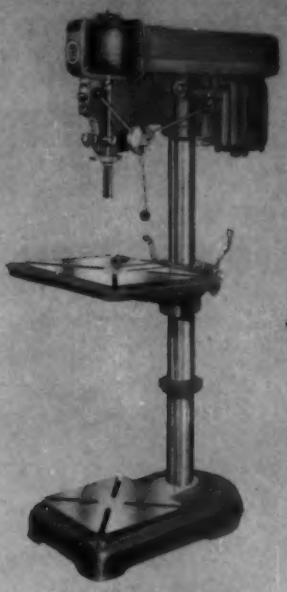

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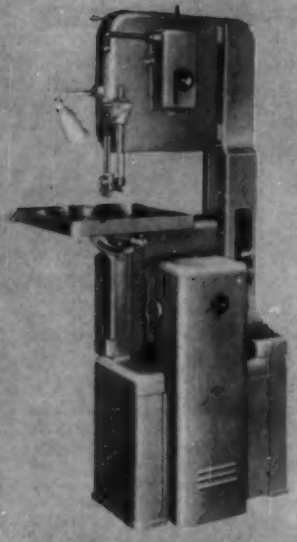
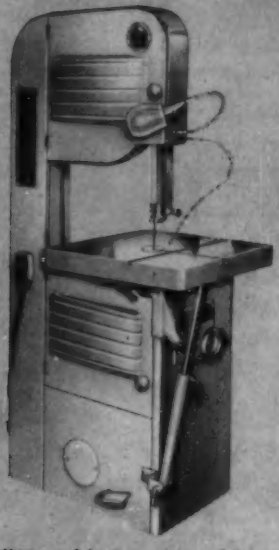


16" Variable Speed Band Saw



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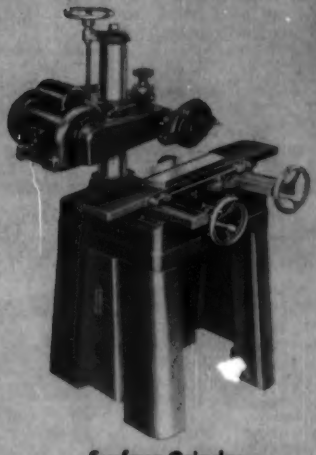

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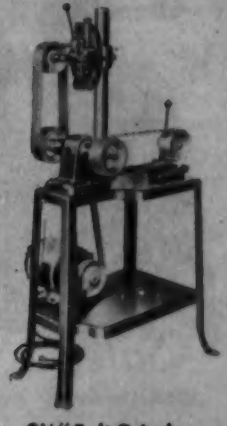

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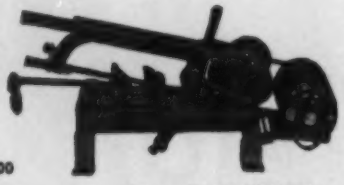

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Industrial Arts and Vocational Education
The Shop Teachers Professional Magazine
JUNE 1959

Our Automated Industrial Revolution—Part V

THOMAS A. HIPPAKA
Iowa State College
Ames, Iowa

Wages, Profits and Prices

For decades, long before automation reached its present stage, the worker, the employer and the consumer have had controversies over the benefits that each should derive from our constantly accelerating productive system. And the end is not yet. Labor wants more pay and shorter hours as automatic methods increase production. The employer wants his profits and no government interference, as he conducts his business. The consumer, of course, wants lower prices on all commodities. With everyone making their demands, it is often difficult to strike an equitable balance, which constitutes the ultimate in the wages, profits, prices triangle. Balance in this situation could mean more economic stability. We need to remember that the shareholder too has a very real stake in the total picture, and that no particular group is entitled to all the benefits of automation.

Controversies between labor, industry, the consumer and the government can very well result in dire consequences to the community, state and nation. Strikes, especially prolonged ones, leave their wounds. Strife of this sort can involve social injustice and jeopardy to public relations. Participants must ask themselves, as well as others, "What is morally right?"

Automation has reached the stage whereby industry cannot afford to ignore its constant advancements. A backward industry can be plagued by inferior products, inability to meet the demand for the products, followed by a slump in the demand, plant obsolesence, unemployment and failure to meet the industry's financial obligations. Risks in investments can actually be greater when a business does not keep its automatization fully accelerated. The possibilities under such circumstances can become very real because a very progressive competitor can force a backward company out of business. Such an eventuality can become a reality in the world market.

As an industry prospers, so fares the community. Is it any wonder that the most progressive industries pay particular attention to community relationships? When an industry fails, the community may be taking its first step toward becoming a ghost town. Consequently, it behooves every taxpayer, whether he is a plant worker or not, to take a genuine interest in the industry or industries that sustain his community. Naturally, the more valuable a product is to any citizen, the more genuine can his pride be in the industry that produces it.

Labor must constantly look to its laurels. As machines reduce effort on the part of the worker, is he guilty of decided relaxation in his effort? Is he constantly lowering the output per man-hour; thereby hindering the effectiveness of automation? Can it be said that the laborer is doing his just share to cooperate with industry, the stockholders and the consumers, in making automation what it really and truly can become; a boon to humanity?

Wages and Profits

In America, the government is a trust, and those who administer it are trustees of this trust. They too have responsibilities to see that the government's policy does not throw our productive system out of balance especially when it involves financial outlay.

Paul Einzig would remind us that:

"The tendency of wages in a free economy is supposed to be determined by supply and demand in a labor market, tempered by rigidities resulting from collective bargaining. In reality the trade unions are in a position to keep the supply of labor artificially low, with the aid of restrictive practices. They are also in a position to increase the demand for labor, because by enforcing wage increases they cause an expansion of consumer demand, leading to an expansion of the labor requirement through the resulting increase in the production of consumer goods and of capital goods. So to suggest that wages are determined by the demand for labor amounts to arguing in a vicious circle, that wages are determined by wages. While an increase in the relative prices of any particular category of goods may discourage demand for them, an increase in the price of labor tends to expand demand for it."

There was a time when the bargaining power of labor was weak. However, that condition does not prevail today. Profit margins very largely influence the level of wages. When profits expand, labor demands higher wages. Naturally, we must not overlook increased productivity and the rising cost of living as bases for greater wage demands.

Automation has had its effects upon wage levels. Since it naturally accelerates production and increases profits, it follows that wage levels should be higher.

Before the days of accelerated automation, the scarcity of labor was very real at times. Automation requires a smaller labor force, especially in the unskilled classifications, thereby complicating the picture even more. What is more, early in 1958, twenty-eight million women were a part of a total labor force of approximately 62 million people. However, these factors need not reduce wages in the near future.

Wages determine an individual's purchasing power. Inflation, as well as deflation, are avoided when we strike the right level of balance in this picture. Low wages bring deficiencies in consumer buying, and goods move at lower prices with our economy tending toward deflation. When wages are high, people may buy to the extent where output lags behind the demand, and the country moves toward inflation, bringing with it serious wage spirals.

Speaking to the United Auto Workers at their Atlantic City Convention early in 1957, Walter Reuther insisted that:

> "The age of automation makes it possible for the United Auto Workers to win a shorter work week and at the same time an increase in take-home pay."

As automation produces more in less time, Reuther demands that the worker should earn more in less time. Not only is automation to increase the workers' salary, but higher wages will have to be paid by industries which have not benefited by automation.

Labor organizations must realize more and more that they constitute a vital force in the country's welfare. Whether we have inflation or deflation, good times or depressions, unions must assume their just share of responsibility.

Wages in Automatized Industry

Wage differentials have always been a problem, but more so since automation came into being. In a highly automatized economy, wage differentials will have to be continuously revised between skilled and unskilled labor, between labor in automatized and non-automatized sectors of the same factory, between automatized and non-automatized plants in the same industry, and between automatized and non-automatized plants in different industries.

Equitable differences between the wages of the workers in the various categories of occupations in a factory will have far-reaching effects. If we are to have the required number of scientists, enginers and skilled workers, their remunerations will have to be such as to encourage them to assume their responsibilities, together with the arduous preparation required for such jobs. Where adequate compensation is not forthcoming, the progress of automation will be seriously hindered. Many concerns are not only financing the preparation of their trainees, but they are placing them on payrolls as full-time employees.

Even unskilled labor cannot be sold short in the matter of wages. Through a strike they can bring the work of a firm to a standstill, for the skilled workers are not very apt to take over the unskilled tasks in order to keep the plant in production.

When a factory is only partially automatized there are bound to be wage difficulties. What really happens is that in the automatized section, the worker is not only paid the best salary, but he does his work under the best of working conditions. In spite of the fact that the workers in an automatized section of the plant are highly skilled individuals does not necessarily eliminate the friction between workers. The only complete solution to the problem is the total automation of the plant in the shortest possible time.

There is no easy answer to the problem of equitable wages in the automatized and non-automatized firms in the same industry. The obvious solution is one in which basic wage rates enable the nonautomatized firms to continue producing profitably as they automatize their plants.

Increased wage demands in the progressive industries influence workers in the static industries to demand more pay. This happens even though the industry may be a declining one. What is more, the progressive firm may be draining the static plant of its much needed manpower. To preserve its manpower, the static firm may have to pay wages far above its profit margins.

There is no denying the fact that engineers, scientists and skilled workers are well rewarded for their efforts. These people head the list as far as pay is concerned. Even the younger scientists and engineers, upon leaving school with no experience whatsoever, may receive rather fabulous salaries.

The fact that competent teachers are poorly paid is something to ponder in a world where our very survival rests in their hands. Capable, hard-working teachers prepare people for industry and promptly see their young graduates receiving substantially higher salaries than they themselves will ever receive. The result in too many cases is that master teachers themselves are entering industry, leaving too many classrooms without the instructors whom our country must retain, if we are to remain a first-rate industrial nation. Teachers as well as the engineers, technologists and scientists must be well paid, if America is to cope, not only with Communism, but world competition in general.

Some Economic Problems in Need of Solution

The advantages of automation cannot be enjoyed without some fluctuations. When our economy is expanding, the advocates of automation naturally increase in number. In times of depression, the skeptics are prone to blame automation for many of the country's economic ills. On the other hand, when there is a recession, a company which expects to remain in business dares not get left behind in the automation race. While there are bound to be some economic recessions as automation progresses, there could be many more disruptions should the United States lag behind other countries in her industrial development.

Naturally, recessions are to be avoided. Apparently, our economy will continue to be plagued by inflation and deflation, much more of the former than the latter. And what is more, we readily accept inflation as the lesser of two evils. On the other hand, when inflation is allowed to run rampant it carries with it the grave possibilities of a damaging slump. Even disinflationary measures taken by a government may lead to a disastrous deflationary spiral. Inflation needs to be checked before it reaches a stage requiring measures that are too drastic.

Inflation is everybody's business. As long as America's national income continues to expand, and automation keeps us comfortable in the world markets, there is no great danger of serious recessions. The best way to guard against recessions is to keep inflation within reasonable bounds. Cost spirals which involve raw materials, labor and profits in the manufacture of goods, must be kept under control. Self restraint, in the matter of remunerative returns, is needed on the part of everyone involved in the production of goods. The government, industry, labor, the farmer and the consumer are all partners in this all-important enterprise. It will be sad indeed, if we refuse to see what is good for our country, as well as for ourselves, when we sit at labor-industry bargaining tables.

Automation presents its peculiar problems and dangers, as does any expand-

ing, worthwhile venture. Nevertheless, this is no sign that automation should be deterred from making the fastest possible progress. Its dangers, as well as its potential advantages to mankind, should stimulate us to greater efforts in making automation an integral part of our civilization.

Understanding, integrity, farsightedness, confidence, self-discipline, good will, intelligence and courage will always be needed, if we are to keep our economy from going into a tailspin. Nothing would please the Kremlin more. This is a constant reminder that we are fighting for our very lives when we insist upon a stable economy. We must realize that risks will always accompany automation, and it is imperative that we take calculated risks without panicking. Only through careful study, unbiased reasoning and consequent action can we hope to forestall serious crises.

Labor, industry, agriculture, the government and the consumer must practice fairness through understanding, as never before in the history of America. The risktaking investor must receive his adequate rewards or he may cease investing in further industrial expansion. If he insists on unfair profits, he may create undue speculation which can lead to excessive luxury spending, unearned profits and even some class hatred. While the worker is usually "worth his hire," he too must practice restraints in his demands. Government control can be cut to a minimum when industry, labor, agriculture and the consumer assume their respective responsibilities as true citizens should.

Automation and Economic and Social Problems

There is no escaping reductions and increases in prices, as well as wages. These problems must be solved equitably for the sake of all concerned, by those concerned, which includes all of us. In a totalitarian country the ready-made solutions come swiftly from its dictator. In a democracy, solutions come much more slowly, but they are citizen conceived.

Where the purchasing power of the worker parallels expanding production, equitably, many economic and social problems vanish. Unemployment and business bankruptcy are at a low ebb. In a country where such conditions prevail, automation will make a very substantial contribution toward that nation's leadership in the world.

Deficiency, as well as excess in purchasing power, can create serious social, as well as economic conditions in our country. Inability to buy reduces the sale of manufactured goods, which naturally leads to greater unemployment. High earnings, without the necessary restraints for saving, lead to inflation and all of its accompanying problems.

The wage spiral, which may constitute one of the potential causes of a recession, remains a possible obstacle to progress in automation. Workers have become the virtual masters of their own destinies through their strong labor organizations and their power to bargain collectively. Their future is largely in their own hands, and they will have to practice self-discipline, not only for their own good, but for the welfare of the whole country. In making wage demands, labor needs to sense public opinion at all times, for public opinion is the most powerful force in a democracy. When it turns against a group, that body of people is in serious difficulty.

The establishment of separate trust funds for employee and employer, to hold increased wages, as well as profits, is worthy of consideration. Through employer-employee co-operation a trust fund can be accumulated and used as unemployment benefits when labor setbacks occur. Increased profits for the employer could be placed in a fund to be utilized for further capital improvements.

Where redundancy occurs among workers, means should be provided whereby they can secure employment in another factory if the present one cannot transfer them to another department. To mitigate hardship is understandable, but feather bedding, for example, is not the answer of a good citizen to any of our problems in industry. We need to realize that where indifference prevails or when questionable methods are employed, automation may be seriously hampered, while the consumer pays an unreasonable price for his commodities.

The age of automation will constantly demand honest *give and take* in the interests of the common good of all. Hostility to profits on the part of the employee, and antagonism on the part of the employer toward the worker, who insists on a decent wage, do not accelerate automation to the country's advantage.

Everyone, the government, consumer, employer and employee stand to profit from the age of automation, especially, if they will assume their rightful responsibilities. Automation means more income for everyone, including the government. The consumer can buy more goods for less money. Employers make more profits. Workers can very well enjoy more pay, shorter hours, more leisure, less fatiguing tasks, and more healthful working conditions.

All people in a democracy must realize that better educational facilities constitute the answer to our industrial problems. The good citizen considers public education one of his many responsibilities. The first to profit from better schools is the worker, for he needs both general, as well as technological education. As he upgrades himself vocationally, he not only increases his income, but he qualifies himself for future promotions. Breadth of preparation affords him the necessary versatility with which to meet citizenship responsibilities as well as new job requirements.

A country as highly industrialized as America must not become peopled with worshippers of their self-created materialism. Nor should the sole emphasis be placed upon the technological and the scientific in education. A democracy must have good citizens well prepared to earn an honest living in their chosen vocations and professions. Above all, we should never neglect the moral and spiritual side of the human being, for what does our material prowess matter, if by gaining it we lose our souls?

Education and Human Happiness

The goods which the miracles of our technological system have created are only a means to the much desired end, namely, human happiness. It is the kind of happiness which will result from the honest efforts of those who would enjoy these goods. If we resort to ruthless materialism in a selfish scramble for worldly goods, man's doom is assured. We need to realize that man cannot live by bread alone; that he has to learn to live a life, as well as to make a living. If we continue to possess the courage, patience, understanding and the wisdom to give automation the chance it deserves, man's needs will be satisfied as they never have been before.

We do not want any part of the quasi-religious worship of technology, so prevalent in the Kremlin. Our crying need is for men and women with character who place the moral, spiritual and cultural values ahead of the gadgets, so miraculously developed in our country.

Paul Einzig would remind us:

> "If, however, automation merely increases greed and selfishness, then mankind would have been better off if it had never been invented."

Excessive production costs are constantly inflicted upon the customer. The consumer must realize that he too has a very grave responsibility in the American economy. When he is willing to pay increased prices that are far out of line, he is shirking his duty, not only to himself, but to his country. He must take his share of the blame for inflation and high prices, as well as the other ills of our economy, when he fails to take a courageous stand on controversial issues.

There are at least four uses that we make profits from industry in this country. 1. We plough them back into the business for capital improvements and

expansion. 2. We declare dividends. 3. The consumer can be made to enjoy the benefits of automation in the form of lower prices. 4. We increase wages. These activities can be enjoyed in the good American way when citizens make their decisions without governmental interference.

Whether automation should be controlled or allowed to develop unrestrained, will always be a question to ponder. There are those who believe that automation should not be allowed to develop unhampered.

Mr. Walter Reuther told a Congressional Subcommittee that his union welcomes automation, but he also warned them that:

"If we subscribe to a laisses-faire belief that these things work themselves out, untold harm can be done to millions of innocent people, and to the whole structure of our economy, and our free society."

Looking at automation from another angle, Mr. Munce, speaking for the National Associations of Manufacturers declared that:

"Automation clearly will be a blessing to the nation if it is allowed to grow by natural economic selection, and if it is not distorted by unwise and unnecessary effort to thwart its effect. . . . Concern for the long-range overall good of the nation and of its people should take precedence over selfish jockeying for special advantage, or throwing road blocks in the path of automation by demanding advanced commitments to labor."

There are skeptics who believe that automation can only succeed in a socialist controlled state, and that it will ultimately become a menace in the capitalistic states. Free nations are constantly proving that automation works in a capitalistic system. Self-disciplined citizens who are willing to practice self-control and even self-denial for the good of their country, will always make automation a valuable asset to any free nation. In the State-owned factories of Russia, the discipline comes from without; workers have no voice in matters of policy; social and human considerations are totally ignored by the State, which runs the whole system of production. In any democratic country, its citizens will always refuse to barter away their rights, including the freedom to work. Government mediation, or interference, as it is called by some, constitutes a last resort after labor and industry have reached a deadlock in any controversy.

In the final analysis, there could be considerable merit in Paul Einzig's theory that:

"Speedy and smooth progress of automation largely depends on the ability of striking a happy medium between excessive control and complete absence of control."

The Impact of Automation Upon the United States

As the demands for goods increase, automation, by virtue of its speed of production, may become a contributing factor in the unwise depletion of natural resources. High-income countries, like the United States, always possess potentialities to aggravate a materials shortage dilemma. To raise the standard of living, which in itself is a worthy goal, would become impossible, were this condition allowed to become a chronic reality.

Guarding Our Natural Resources

The United States does not constitute an inexhaustible source of raw materials. This we need to understand, and keep ever before us. In fact, we are already importing a very substantial amount of the raw materials now used in our factories. It is time we awakened to the stark realization that other nations, both great and small, may be preserving their natural resources with visions of the future, while we squander ours in a mad rush to flood the markets with goods of all descriptions. A certain amount of backwardness may be the very condition which compels certain countries to preserve their natural resources, because they do not possess an industrial system capable of the rapid change of raw materials into usable goods.

Although the United States is a relatively young nation, there are many indications that our natural resources are being depleted too rapidly. Approximately one-third of our top soil is gone. Wasteful cutting of our forests, as well as their devastation by fire, have made serious inroads into our lumber supply. Our iron ore supply has dwindled to a point where we are forced to mine very low grade ores of approximately ten per cent purity, when only a few years ago we mined no ore of less than fifty per cent purity. The oil potential in the United States was down to thirty billion barrels as compared to two hundred and thirty billion barrels in the Middle East, in the year 1957.

Synthetics do not constitute the total answer to the possibility of depleted raw materials. A condition can arise where irreplaceable materials are completely exhausted. In many cases, the manufacture of synthetics demands certain amounts of the basic material itself. When we lightly dismiss the possibility of material shortages with the synthetics approach to the problem, we are stepping on dangerous ground.

The law of supply and demand can be a deterrent to the promiscuous use of basic raw materials. When they are difficult to get, prices soar and sales drop off. The situation may compel men to seek further sources of materials, or resort to the time consuming development of synthetics, all of which can create more employment. On the other hand, where plant production has to be curtailed while waiting for materials of manufacture, production workers may be enduring enforced idleness.

Shortages in raw materials do not tell the whole story. Accelerated automation may exceed the rate at which power can be generated. Requirements can outrun the supply of coal and oil already in short supply in the United States. We can very well have a serious problem in this area before fission, and more especially, fusion power, are perfected for factory use.

There can very well be a serious shortage in water supply. Industry requires tremendous quantities of water, and automation shows no signs of lessening this demand. Industries may have to move where the water supply is more abundant. Meanwhile, scientists bend their efforts toward securing fresh water from the vast oceans.

Nations have attacked other peoples for various reasons ever since the world began. One reason why Japan attacked us at Pearl Harbor was to put the American fleet out of existence, in order that she might secure oil from the Far East with less interference from us. Japan was going to need oil because her military leaders felt that they would eventually have to fight the United States. There have always been the *have* as well as the *have not* countries. There is no guarantee that automation will alleviate this condition. Certain more fortunate countries can very well control critical raw materials, resulting in political friction, and even war. The push-button factory could very well be a factor in creating a push-button war. Even stock piling can lead to serious trouble. The stability of a country, including the adequacy of its defenses, depends upon the continuing flow of critical raw materials. These matters, among many others, will have to be settled around conference tables by reasoning men, if world strife is to be alleviated.

Russia can very well continue to extend her peculiar kind of bartering tactics. She can frighten more people into accepting her manufactured goods in exchange for critical raw materials. As an initial inducement she may *pay* backward countries prices far above the level of current, world prices.

Statesmen will have to continue working upon a sane balance between supply and demand, especially in the areas of critical materials. Such a secured balance will eliminate a host of problems. Meanwhile, new sources of raw materials are being unearthed, while research creates new substitutes. Greed will have to be replaced by mutual understanding and helpfulness among peoples, as the

search for raw materials becomes more difficult.

As humanity's desires are satisfied through automation, man will continue to keep the wheels of industry turning through various material resources. Man is going to the remote areas of the world in quest of suitable raw materials. The race is between the production of synthetic and natural raw materials, constantly accelerated by automation. Only reasoning man can keep this race under control, and in balance. His very happiness and ultimate fate depend on how well he does this job.

Factors Governing the Utilization of Automation as a Productive Process

Accelerated production, leading to greater comforts in living, stems from a combination of circumstances. Maximum progress in production results from research, hard work, efficient factory organization, improved technological methods, the effective use of our natural resources, and to our sorrow — wars, either hot or cold.

Economic trends have a direct bearing upon automation. Good times encourage progress in automation, while poor times usually discourage technological progress, with this one exception; the more courageous and prosperous industrialists upgrade their factories for the future, even during periods of poor consumer buying.

World War I, but more especially World War II, gave automation a terrific "shot in the arm." To win, we had to out-produce our enemies in war material. Since our young men fought these wars, as they always do, a manpower shortage resulted. To overcome this condition, machines had to make up for this deficiency.

Wars generally accelerate inventiveness in terms of scientific and technological developments, as well as more efficient production methods. American genius in these areas is not to be denied, especially when our very survival is at stake. Under such circumstances, the United States government has spent billions of dollars for research in the total area of manufacturing, all of which has helped give the world automation, as we know it today. For example, without electronics we could not have automation in its truest sense, and World War II gave the world electronics.

It is to be regretted that so much of our technological development has to come through war activities. Coupled with this situation is our attitude toward money. It takes a war to force us to spend money for essential technological developments. In fact, we waste it by unwise planning. In World War I, as well as World War II, we outproduced our enemies in order to win. In a cold war, superior military "hardware" creates a respect for us on the part of those who would be our enemies, thereby preventing a hot war.

Various interesting factors have contributed to the phenomenal development of automation in the United States. Scarcity of labor generally forces a country to accelerate the improvement of machines and methods of production. Rising wages can go hand in hand with automation. People with purchasing power buy more and create even greater demands for products. Expansionary monetary policies help by permitting industrialists to spend more money on research. Installment credit encourages certain consumers to obligate themselves *to the hilt*, and even beyond this point, if their creditors will permit them to do so. Rising prices often stimulate production. Continued government research is bound to accelerate automation. Industry's keen interest in research, and the very substantial reduction in the time lag between scientific discovery and technological invention, has made a vast difference in our progress. Then there has been the cold war and its consequent pressures, which have kept us *armed to the teeth*. Never in the history of the country has there been such a unique combination of circumstances, so conducive to technological development, including the advancement of automation.

American inventiveness, since the founding of our country, has continuously given rise to new industries. New products have often necessitated new machinery for their successful manufacture. The dead weight of obsolete equipment has always been a problem — never completely eliminated, it would seem. Even when a new industry can *start from scratch* in order to establish an automated plant, its equipment may become obsolete in terms of the machinery being employed by its competitors.

The immediate postwar development of automation varied most strikingly in a number of countries. Britain lagged far behind the United States, due to high taxes, a conservative attitude toward innovations, lag in technological education, inadequacy of the British gold reserves, difficulties encountered in diverting labor from the office to the factory, and the Trade Union policies. Contrariwise, Germany, in spite of all of her wartime destruction, started from *below scratch*, and through dogged persistence proceeded to rebuild, as well as to equip her bombed-out industries. Russia, of course, intends to spread Communism throughout the world, so her factories, as well as those of some of her satellites, are gradually becoming automatized.

Guarding Our Natural Resources

As we out-produce the other peoples of the world, it becomes more imperative each passing day that we guard our natural resources well. It is a grave fallacy to believe that our material resources are limitless, and that they cannot be exhausted. For the sake of an illustration; the oil potential in the Near East was two hundred and thirty billion barrels in 1956; in the United States during the same year it was thirty billion barrels. We say glibly that we can create synthetics when we run out of the real basic materials. This concept may prove an absurd oversimplification of a condition which is apt to grow progressively worse in the not too distant future.

There exists a very real possibility that we can foolishly sap our raw materials to the point where our comforts and enjoyments will reach a mediocre plateau, beyond which we cannot extend them, in spite of our miraculous machines of production. This grave condition will be assured if, and when we have recklessly squandered our natural resources.

Population increases alone in the United States will constantly accelerate the demand for products of all kinds. According to the basic data issued by the United States Department of Commerce and the United States Department of Agriculture, the 4.35 million babies born in the year 1957 will need approximately one billion pairs of shoes, twenty-five billion pounds of beef, twenty-two billion pounds of pork, ninety-one billion gallons of gasoline, fifty billion quarts of milk, two hundred million tons of steel, sixty-five million tons of paper, six million refrigerators, sixty-three million suits of clothes, and eleven million new cars.

Automation, as such, will never be complete. Scientific research followed by continuous technological developments, will provide a constant impetus to the further enhancement of the system. As old problems vanish, new ones will be created. Until automatic devices themselves can be mass-produced, certain investors will be cautious about installing such equipment, even though their type of production lends itself to automation. Innovations are bound to accelerate factory obsolescence, compelling management to modernize plants, costly as that may be, if they expect to remain in business. Properly balanced, the components of automation can constantly make the system more effective, thereby creating jobs and other benefits to all of mankind.

R. H. Macmillan does not hesitate to make the following significant prophesies for further technological development in our constantly changing industrial revolution:

"It is clear that technical advances (particularly in electronics), coupled with the

present economic situation, have now put into our hands the means for remodelling the processes of manufacture. And this will occur, not only in those sections of our economy where production is relatively uniform, but eventually throughout industry, for the new techniques of control will make automatic production more versatile and will eventually enable us to make the majority of goods automatically."

While Macmillan has made these rather inclusive predictions regarding automation, he would be loathe to say that automated factories will eventually produce any and all industrial products. While automation will have its affects on our economy, it will not produce unemployment upon a scale impossible of solution.

Certain hurdles related to production will tend to afford time, in which workers and their families may make the inevitable adjustments, as automation becomes more universal. Where production is relatively uniform, as in the manufacture of ball bearings, bricks and soap, automation moves forward rapidly. On the other hand, certain products will have to be redesigned if automated factories are to produce them. Marketing such products presents a problem. Capital outlay, shortage of equipment, equipment maintenance, lack of properly qualified workers, procurement of raw materials; all tend to slow up automation. The presence of these problems should tend to alleviate our fears regarding sudden industrial changes such that workers would be unable to cope with them. However, man will have to combine heart, head, hand and machines in his endeavors to survive on the face of this earth.

A Drafting Instructor Looks at Industry and School

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In the development of the school drafting room, we have seen a great transition in the physical setup from one in which the 18 by 24-in. drawing board and 24-in. T square predominated, to the present-day layout. This type of layout is comparable to industrial drafting rooms today.

The drawing area in schools seems not so universally affected generally speaking throughout the country. Basically, we still have the same fundamentals now as we had a decade ago. The instruments used in drawing look about the same with some modifications by manufacturers.

Evaluate Program by School

It would seem reasonably urgent that the drafting instructor evaluate his program and course outlines in the light of present-day practices within industry today.

With the increasing demand of skilled labor in all areas of occupational life, both management and labor are intensely interested in what the schools are doing to augment the supply of trained personnel. If the schools are to be successful in helping this demand, it is most important that management, labor, and school sit down together and work out a program to meet the increasing demand of skilled labor.

The physical plant facilities of most trade schools throughout the state and country are very adequate, yet they are not used to the fullest extent at a time when industry is demanding semiskilled and skilled labor.

Facts

In the city of Racine, Wis., with a population of 78,465 (1954) there are a total of 301 apprentices being trained in 57 different trades at the time of this writing (May, 1956). Last year's high schools' graduation classes within the city listed 25 per cent of the graduates entered college or university, with less than 5 per cent between the ages of 19 to 20 entering a trade. The total enrollment at the four high schools in Racine is 3,738 from which 935 ventured higher education and 187 went into a trade.

Shortage of Scientists and Engineers

Since we have such a shortage of scientists and engineers throughout the country today, and the four high schools in the city of Racine are doing much to promote students fitted to enter the fields, yet that does not answer the critical problem of augmenting the supply of trained personnel that industry is asking for today.

If less than 5 per cent between ages of 19 to 20 enter trades and it is apparent that more enter the trade after the age of 20 for which no follow-up is made and 25 per cent go on to higher education, what has happened to the counseling and guidance which the 70 per cent of school youth no doubt received in almost all high schools stimulating interest to enter the trades; yet only 5 per cent chose the trades when it should be comparable to those going on to higher education. Pre-apprenticeship training can do much to promote the trades for this 70 per cent majority.

The machinery for training personnel for industry is available; it is only a matter of putting it in motion on a much stepped-up program. There are some

trade schools standing virtually idle during the day time, while the evening programs seem to do much better.

In order to promote a greatly stepped-up program which can be done, management and labor, technical school and high school administrations must sit down together and select proper personnel to organize a much needed training program that will satisfy industry as a whole. Then, too, industry must be sincere in their endeavors by creating vacancies, incentives in pay, and occupational merit which will support the program.

The gap between industry and schools is much too large. Although in recent years it has been greatly closed through the apprenticeship program, yet one of the greatest evils to the apprenticeship program is the fact that the employer seems to forget the written agreement or contract and the apprentice suffers until someone in authority calls attention to the evil. This all comes about because employers were not sincere in their agreement from the start. However, the probationary period should serve just as much as a tryout on the employer as on the apprentice.

Enlisting people from industry through the medium of representatives chosen from the fields of management and labor is, however, not justified when the majority of the panel or committee is not interested in the performance of their duties. However, much has been written on the functions of advisory committees in the apprenticeship program and unless these functions are made available and followed with sincerity, the training program will die a slow death. One cannot overemphasize sincerity in the program and not wear a mask of insincerity which is one of the most exhausting things in life.

Who Shall Start

The start of a greatly accelerated program in cooperation with industry and school for youth graduating from high school, and those dropping out prior to graduation, must originate in the high schools first with a pre-apprenticeship training program working hand in hand with the technical school. Some schools claim to be doing this already and more power to them. For the greater share it seems as though the high schools adhere to the objectives to train for higher education with the majority going into various occupations and only less than 5 per cent entering the trades. Industry claims a shortage of skilled and semi-skilled help, and they, too, are turning their back on a solution of problems and the third party being the technical school, also is within their own problem, by standing by and not taking the first step to promote a stepped-up program on a daytime basis. The larger industrial plants in the country today have answered the training problem by instituting their own within the plant training program; however, less fortunate plants should avail themselves of the same program via technical schools that turn out a good product.

Summer School Credit

The instructor teaching in this program should work at his trade or field of teaching at intervals during summer vacations and should be granted summer school credit for so doing. This type of training is almost an essential for the instructor because it will help close the gap between industry and school. Then, too, he can better appreciate the problems of industry.

Supervision

Without good supervision this type of program cannot last and this is one of the weak links that has caused programs of this nature to fail. The success of a program of this nature is wrapped up into one word — *sincerity*.

Administration should take time out from their desk duties which bog them down and meet this virtually untapped resource for training and accept the challenge with utmost sincerity, and in that way help close the long existing gap between school and industry.

Apprentices Are Still Short

In a recent conference on apprenticeship in San Diego, Calif., attended by about 1000, charges came into the open as to reasons for the shortages.

Oldtimers cannot live forever, and fewer youngsters are replacing them. Some employers feel that they cannot afford to spend four or five years training a man to be a carpenter, bricklayer, or tool and die maker. One of the most common charges is that labor unions restrict recruiting of apprentices. That, however, is justified for the most part by normal ratios of apprentices and journeymen.

We have 250,000 apprentices in the United States with a population of over 160,000,000. Compare this figure with West Germany. It has 47 million population and 2 million apprentices.

Training for Girls and Women

Women, steadily increasing in the working force of this country, now constitute about 29 per cent of all workers. The importance of training women is recognized by all vocational-education administrations.

Much can be done on a post high school level for girls preparing to become dental and doctors' assistants. These courses, which offer theoretical and practical work, have been organized with the help of dentists' and doctors' associations, who have been most cooperative on such matters.

Interest in training practical nurses both in clinics and hospitals is increasing, and the Kenosha, Racine, and Milwaukee Vocational and Adult Schools are doing much to foster the programs with much success.

A postal clinic in co-operation with the Racine Post Office has proved to be of great value and interest on the part of local industry as another training course which the vocational and adult school has promoted.

But the biggest problem facing vocational education on the trade and industry level is how can we induce a bigger daytime enrollment and help industry, labor, and management with their skilled and semi-skilled labor shortage today?

A day school Smith-Hughes student learns to lay out, using surface gauge and plate. William Mieszczak is instructor

Photograph submitted by J. F. Jeffery, director of vocational education, School District, Erie, Pa.

Time for Awakening!

VINCENT O. NAPOLEONE
Riley Junior High School
Livonia, Mich.

We, as industrial-arts teachers, have at our disposal a tremendous potential that is as yet not fully realized. I'm speaking of our educational laboratories, the shops, specially equipped for the important part they should play in the total educational program. We are in a dynamic age with an approach that is too often static. Thousands of dollars have been spent for our facilities, and lately, critics have questioned the purpose and value of industrial arts. Too often counselors have taken the position — "if the student can't do academic work put him in the shop where he can work with his hands." I raise this question — why have we become in many schools, the fix-it corner for the schools and the dumping ground for the mentally retarded and problem students?

First, our present program is much too narrow with practices heavily influenced by a vocational philosophy that has restricted the curriculum. The industrial-arts program should place an emphasis on general education. Vocational education and industry are better equipped to teach the highly specialized skills and assist with instruction in occupational training. Overemphasizing manual skills in schools assumes that all students are in training for a particular vocation. Let's not be naive. In this age of multi-occupations it is anyone's guess where our students will earn their livelihood. It is therefore believed that we have not fully utilized our facilities in developing a program to contribute to the general education of youth.

We should feature a program that appeals to the *full range* of student intelligence, not just the low or middle groups. Too often in our present programs the bright student finds little to challenge his talents. He respects thought provoking assignments that are current in nature and require mental challenge for solutions. Currently we often lose this type of student, and as a result are required to work only with the average and slower student. We need, of course, to assume responsibility for instructing the slow student also, but results currently suggest that we tend not to be getting much above this type. This seems especially so at the high school level.

Then too, there is a problem of stereotyped terminology in our work. Too often the terms *shop*, or *shop class* is looked upon by laymen, and some students to mean activities and studies of secondary importance. Then there are those who still refer to our work as *manual training*. We ought to minimize the use of the term *shop* in industrial arts. Actually it is a very narrow term which the laymen can easily misconstrue and stereotype. Many of our course titles fall heir to this. To cite a comparative example, when we refer to the course entitled *algebra* its representation is clear and extensive. On the other hand consider the title *metal shop* — it lends itself to weak generalization, and hence the stereotype. And, for comparison, consider the title *metal fabrication*. This

Fig. 1. The student observes a high variety of activities about him through individual assignments

Fig. 2. A project development requires stimulation through timely references. Problem solving comes by way of sketching, experimental modeling, and then fabrication

Fig. 3. These students are interested in architecture and are engaged in designing and modeling a swimming pool

tends to suggest a broader scope with a contemporary ring. We need to use contemporary terminology as we sell our program. Let's remove those obsolete terms.

Basically it is a fault that we are not fully utilizing new developments in instructional approach. We need to make use of contemporary references, challenging industrial activities, and the encouragement of fresh open-minded ideas. Herein lies the potential we must pursue to unleash industrial arts to its fullest.

In the past two years I have been experimenting with ideas that seem so successful as to suggest needed change in our field. My purpose here is to report some of these and suggest several methods that may provide for a more dynamic program in a dynamic society.

Instructional Approach

To begin with we look upon the shop room as a laboratory where students can explore the medium of the tool and the material. This includes the origination of an idea through the entire processes that result in the product: emphasis on creativity, problem solving, and aesthetic taste. Assignments are made individually against an infinite list of project-subject areas. For example, clock dials — saladware — candlesticks — and so on. The approach is placed on a problem solving basis whereby the student is asked to create an individual design based on line — form — function — and good taste. The key premise is not to design a lamp or a tray, but to design an object for lighting or a container for some specific item. This tends to stimulate the student's mind toward an original design. Throughout the program we try to find highly interesting assignments that will suit and challenge the individual student. The key here is to supplement his background by having on hand some of the newest ideas through references on fabricating techniques, devices, materials, and experimental design. In a subsequent paragraph I have listed such reference material.

The student is asked to try to develop a design on paper. Students who have a flair for design and creativity accept the assignment and originate surprising ideas. The less talented group with a little help and encouragement also do well. Students who find the request difficult receive direct help from me or from one of the more capable students. The student is encouraged to make up a miniature model ranging from a simple templet to a basic structure in an effort to study and develop his design. Such materials as construction paper, wire, hardboard, wood strips, cellophane, and glue are on hand. If the student's ability permits and the idea requires a more involved layout, several drafting tables are available to assist him in his efforts. Upon approval of his design, he proceeds in the shop-room to build it.

I have on hand a wide variety of woods, metals, plastics, and miscellaneous materials. A unique by-product of the individual project approach is that the student observes a variety of operations and activities about him that add to his knowledge and experience. Demonstration of new operations are made on the spot as the need arises, and informational topics are discussed and scheduled. Evaluation is based on the product of the combined average of the quality — co-operation — planning mark, and the individual standard time. In addition a fixed amount of "bonus" points are given for an original job of designing. It is encouraging to see the wide variety of instruction that will have been covered by the end of the semester plus an abundant number of attractive and varied objects produced.

New References

If we decide to keep our program abreast in a dynamic society we must look to the leaders of its movement. In our field, it's the designer, the engineer, the architect, and the craftsman. These authorities publish numerous bulletins, magazines, and books. Here is our core of references, source of new ideas, and a guide to improve and stimulate the industrial-arts curriculum. One caution: if the teacher expects to find ready-made project plans complete with dimensions and steps on "how to do it," these references will appear useless. On the other hand if he can appreciate the design elements and identify the material and its construction, he can stimulate an enrichment of unlimited potential in his program. These references only suggest projects and types of activities. They stimulate ideas and educate in a wide variety of industrial endeavor.

The following represents a partial list

of the publications I am using and find exceedingly helpful.

Magazines:
Industrial Design
Craft Horizons
Interiors
Arts & Architecture
Design Quarterly
Living for Young Homemakers

Bulletins:
The Herman Miller Collections
A B C's of Modern Furniture

Books:
Modern Danish Furniture
Display
Problems of Design
Contemporary Industrial Arts Projects
Contemporary Metal Home Furnishings

Film Strips:
Design

Group Project Development

Here is an educational area that industrial-arts teachers should explore. This is a type of assignment that is directed at the above average student who plans to study engineering or architecture. To describe it may I picture the appointment of 3 to 5 interested students who will work as a team or group on a specific project of technical nature. This could be scheduled in an advanced course in industrial arts. Such subjects as a working model of a wind tunnel, monorail, or a city of the future would be applicable here. The basic aim is to stimulate critical thinking on the problems that must be considered in creating a technical, functional idea. At the public school level, I believe our students have been deprived of the opportunity to utilize their math and science training in solving three dimensional problems. Here is their opportunity to use theory on realistic problems.

The student team approach might be something like this:

1. Select an interesting project.
2. Research design and establish assignments.
3. Develop design.
4. Break down the fabrication.
5. Construct the parts.
6. Assemble.
7. Trouble shoot.
8. Demonstrate and display as an educational report.

There are a multitude of values to be gained from such activity. It is a scaled down version of engineering. Then too, the student is stimulated to think and utilize technical ideas as he has an opportunity to demonstrate function and operation and explain his achievement before a group. The secret to success in this plan is in the selection of highly interesting technical projects that have dramatic appeal when completed.

Academic Correlation

There is a potential in the industrial arts for enriching the academics. The following are suggested:

1. To assist in educational exploration related to the academic areas of general education.
2. To make partial use of shoproom facilities and its potential products in enriching units in language arts, social studies, and exact sciences.
3. To foster greater student interest and learning in academic subject matter.
4. To provide and aid in the development of teaching aids for academic subjects.

The industrial arts teachers have the facilities and ability to help dramatize academic instruction. For example, if in social studies, the class were studying mass production and its effects on society, two or three students in the class might be assigned the job of assembling a static model of an assembly line. Through *special arrangement* and *coordination* these students could undertake the project in the industrial-arts department. It is easy to see that they would take back to the social studies program something to see, explain, and discuss.

I must mention at this point the conditions for scheduling. First, all subjects in the industrial-arts program should be available for this service as needed. Arrangements are made on a part-time basis. A full time industrial-arts program would prevail. And, this would have to be limited to a maximum 20 to 22 student load per class to allow for the added activity.

In the areas of science and math there is much that could be applied in our medium. Consider students constructing teaching aids that demonstrate principles and proofs that help clarify the abstract. Consider English and the creative student writer who through descriptive interpretations uses some of our better project products as its subject. And, needless to mention, the fine

(Continued on page 194)

Fig. 4. These boys are from science class on assignment to construct transits that will be used by their class on a field problem

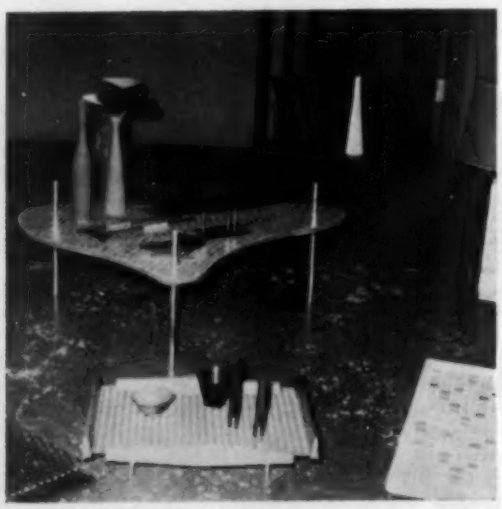


Fig. 5. We need to dramatize our tangible works with color, position, and background

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

THE LONG BEACH, CALIFORNIA, AIAA REPORT

THE American Industrial Arts Association held a most successful convention at Long Beach, Calif., April 22, 23, 24, and 25, 1959. The attendance was good and the convention meetings were very interesting and all were well attended.

The American Council on Industrial Teacher Education, an affiliate of the AIAA, held its meetings on Wednesday, April 22 and Thursday, April 23, 1959.

At these meetings the discussions revolved about the theme "Preparing Industrial Arts Teachers to Meet the Needs of the Exceptional Learners."

John D. Rowlett stated that gifted learners usually have little trouble with their schoolwork. They are interested in industrial-arts work and like problem solving.

Robert Evans pointed out that the talented should be confronted with a higher type of studies than those planned for average students. He suggested something on the type of research problems.

Todd H. Herring suggested we prepare work that will tax the students, even if it helps them to advance beyond the level of their own teachers. Train them to prepare mass production problems. Work out the production problems that confront industry, and work out all the details that industry meets.

At the business meeting of the American Council of Industrial Arts Teacher Education, with John A. Fuzak, president, presiding, the following officers were elected: vice-president, Dr. Paul Hiser, Oswego, N. Y.; treasurer, Dr. Don Lux, University of Illinois, Urbana, Ill.; and Dr. G. S. Wall.

At the luncheon at 12:00 noon, the Annual Yearbook VIII was presented and discussed.

At 2:00 p.m., T. Gardner Boyd spoke on projects and problem solving. He emphasized that both projects and problem solving must be kept at a level of the students' understanding, and that the related information must be stressed.

Edwin L. Furth said that not all students can absorb abstract subjects, but that with proper guidance they can acquire some problem solving ability and the habit of gathering facts that will help them solve problems that come up.

Kenneth F. Perry stated that fine arts is a creative process, and that industrial-arts require both skill and knowledge.

The American Council of Industrial Arts Supervisors' annual meeting on Wednesday morning was presided over by John M. Hurley, president.

The vice-president of this group is Morris J. Ruley, and the secretary-treasurer is Merrill C. Hamburg.

The topics discussed at the Wednesday morning session were: "How Industrial Arts Vitalizes the Curriculum for the Exceptional Learner"; "Training Tomorrow's Leaders"; "The Slow Learner"; "Collecting and Recording the Achievement of the Exceptional Learner"; and "Current Supervisory Practices in Educating the Exceptional Learner."

The American Industrial Arts Association chose for its convention theme "Industrial Arts for the Exceptional Learner."

Dr. Chris H. Groneman presided at the general meeting.

On Friday morning Kenneth Perry Colorado State College, Greeley, Colorado, spoke on the topic "Contributions of Industrial Arts to the Education of the Exceptional Learner."

This meeting was followed by sectional meetings on "What Specific Things are Being Done for the Exceptional Industrial-Arts Learner." Five discussions were carried on by five separate groups.

Friday afternoon, William E. Warner spoke on "The Need for an Appropriate Experimental Attitude on the Part of Industrial Arts Teachers."

Donald G. Lux discussed "The Techniques Which Will Help Industrial Arts Teachers to Identify the Exceptional Learner."

Topic 3 on "Practical Testing Which Will Help the Teacher in Understanding the Exceptional Learner," was presented by John M. Hurley.

Marshall L. Schmitt in Topic 4 presented the view of "Agencies Now Working With the Atypical Child."

J. Lyman Goldsmith spoke on "New Methods of Teaching Which Will Help Industrial-Arts Teachers Develop More Fully Our Human Resources."

M. Ray Karnes summarized these presentations.

The Epsilon Pi Tau breakfast was held on Saturday.

Demonstration programs were presented Saturday by master teachers using closed circuit television in the following areas: woods, drafting, electricity, radio, metals, handicraft arts, and graphic arts.

John J. Metz, editor of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, was pleasantly surprised Saturday morning when he was presented with a citation from the American Industrial Arts Association, 1959, which reads as follows:

John J. Metz — in recognition of your years of service to "The Ship" and your unselfish and personal interest in fostering and promoting the ideals and purposes of industrial education on a national basis.

Signed { Kermit A. Seefeld, *President, AIAA*
Kenneth W. Brown, *Secretary, AIAA*

April 25, 1959 Dated Long Beach Convention 1959

At the business meeting of the American Industrial Arts Association, the following officers were elected: president, Dr. Ray M. Karnes; first vice-president, Dr. Ivan Hostettler; vice-president for classroom teachers, William Wilkinson, Wallingford High School, Wallingford, Pa.

The next convention will be held at Toronto, Canada.

The American Industrial Arts Association banquet was held on Saturday at 6:00 p.m.

Kermit A. Seefeld, president, American Industrial Arts Association, presided.

Max B. Skousen, training specialist, Lockheed Aircraft Coordinator, California Division, spoke on "Getting Our Money's Worth."

The Ship's prize distribution followed this address.

AN IAVE EDITOR'S FAREWELL

WITH the June, 1959, issue of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION Magazine, John J. Metz ends his 32 years of editorial service on that periodical.

He wants to extend his thanks to the thousands of subscribers who have made it possible for the magazine to exist, to the many authors who have favored him with material for its publication, and to the many advertisers who have chosen our magazine to inform their field of the goods they have to offer to it.

Last, but certainly not least, he wants to thank The Bruce Publishing Company for the privilege to edit the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine.

Problems and Projects

AMERICA'S AMATEUR CRAFTSMEN AT WORK

ERNST H. SUERKEN

Dobbs Ferry, N. Y.

America's amateur craftsmen have again demonstrated their originality, ingenuity, and an improvement in their technical skill as shown by the award-winning entries in a woodworking contest which drew entries from all over the United States, as well as Canada, England, Scotland, Germany, Japan, and Africa. The contest was sponsored by Albert Constantine, Jr., President of Albert Constantine and Son, Inc., 2050 Eastchester Road, New York 61, N. Y. Mr. Constantine's firm is 146 years old. It is known as "the lumberyard known round the world." It sends rare woods and woodworking supplies to amateur craftsmen in the United States and other countries.

Besides the award-winning projects other entries showed extraordinary craftsmanship. They included all kinds of veneered, inlaid and carved furniture; grandfather and grandmother clocks; musical instruments; inlaid pictures and intricate marquetry work, wood sculptures; decorative lathe work in wood; miniatures and models of various types; and even such unusual items as a full-size stagecoach. John K. Sessions of Riddle, Ore., submitted a four panel floor screen made of 996 pieces of wood which took 271 hours to put together. Other entries came from Army officers in California and Pennsylvania, a priest in Chicago, and a physician in Virginia.

The competition, which was for projects completed between January 1, 1957, and March 31, 1958, was divided into three classes: (*a*) projects veneered by the contestant; (*b*) projects made of lumber or solid wood; (*c*) projects made of lumber and plywood in combination.

Figure 1 shows a credenza or cabinet veneered with mahogany crotch veneer and set off by tulipwood borders and inlays. It won first prize (Class A) for Anthony M. Bosco, a senior in the Everett Vocational High School, Everett, Mass. Anthony built his own forms for laminating the curved panels and doors and made most of the inlays himself. His plans were prepared from a photograph of a similar cabinet published in a magazine.

Figure 2 is a Chippendale cupboard of cherry wood by H. Lloyd LeCompte, Jr., of Towson, Md., who found the inspiration for his second prize (Class B) Chippendale cupboard of cherry wood in a corner cupboard of the same period at the Boston Museum of Fine Arts. Mr. LeCompte developed all the necessary assembly and detail drawings himself. He used dovetail and mortise-and-tenon joints adhering as closely as possible to cabinet making methods of the Chippendale period.

Figure 3 is a solid mahogany clock case by Captain Victor Goudy, United States Air Force of Middletown, Pa. He maintained the honor of the Armed Services by winning one of the third prizes (Class B) for his solid mahogany clock case. It is 73 in. high, built from solid mahogany with columns and finial of cherry. Captain Goudy designed the clock and made a full-size layout on his workshop door before starting construction. The judges were especially impressed with Captain Goudy's exceptionally clean-cut workmanship.

Figure 4 shows a Colonial tall clock case for which a tie third prize (Class B) went to Arthur L. Armstrong of Missoula, Mont. His colonial tall clock case of Honduras mahogany was based on a pen and ink sketch in Nutting's "Furniture Treasury." The case is 8 ft. 3 in. tall and 23 in. wide. Mr. Armstrong made all the moldings with a small shaper or by hand. He fluted the columns on the shaper and carved all shells, rosettes, and finials. Mr. Armstrong devoted thirteen months of his spare time to the project.

Figure 5 is a secretary made by Trimble Sharber of Nashville, Tenn. He designed this secretary of exceptional refinement in detail and craftsmanship to win second prize (Class C). Mr. Sharber's design is a modification

Fig. 1. Credenza or cabinet veneered with mahogany crotch veneer and tulipwood borders

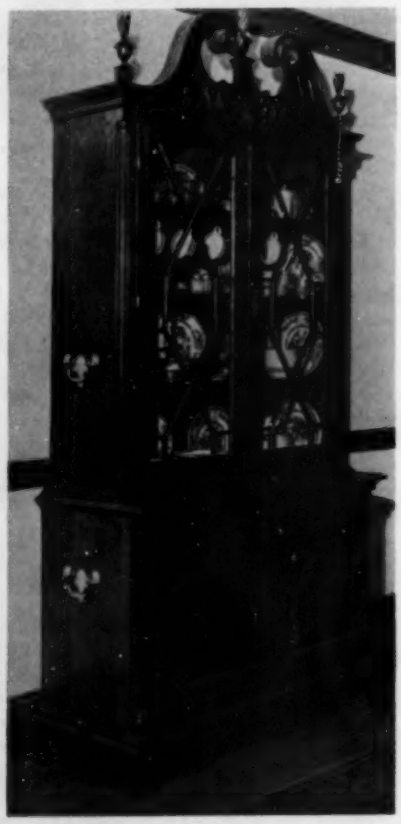


Fig. 2. Chippendale cupboard of cherry wood

of a Williamsburg piece and was made from a photograph and overall dimensions rather than from formal plans. The principal wood is cherry. It is finished with maple oil stain, lacquer sealer and gloss lacquer, rubbed with the finest steel wool and waxed.

Fig. 5. A secretary

Fig. 3. Solid mahogany clock case

Fig. 4. Colonial tall clock case

IN-SERVICE DESIGN COURSE FOR INDUSTRIAL ARTS TEACHERS

ALEXANDER F. BICK

Milwaukee Public Schools
Milwaukee-Downer College
Milwaukee, Wis.
Stout State College, Summer Session

Lesson 1 of a Series

The objective of this design course is to build a broadened teacher viewpoint on design.

The average shop teacher's outlook is not broad enough for a profession which claims to occupy a key position in the current changing world. His view should widen over the whole horizon.

The restricted technical view might better serve the need of purely trade subjects; but industrial arts is not vocational education. This is said with tongue in cheek, because, if we are frank, we know too well that a majority of shops in the nation teach industrial arts as though it were vocational education. The departmental approach has confused the public for decades, particularly when its apparent purposes are denied. What shall the citizen think when what he knows of shop conversation and its method of teaching, are so obviously vocational?

Even so, industrial arts is general education, theoretically, if not in fact. It is education by *doing;* preliminary tool and materials exploration, covering roughly about one-third of the time devoted to the work, while the remaining time should be given to pure general education.

Related information is frequently mentioned as a general education phase of industrial arts, though it is taught without the advantage of the *doing* approach, and it always seems that it is out of focus with the *doing* activity of the moment. Its more or less forced injection into the train of procedures and its inadequate handling for want of time and example, reduce its scope and significance. The product, in any case, is not a true picture, and the time given to it is not warranted. At best, it is background subject matter, in the same category as the *movie* background, which is pictured as authentic stage scenery. In the shop, such material might be given on charts and set up to be perused at will, without the expenditure of words.

Tool-parts information is another example of time consuming waste, filling needlessly complicated courses with volumes of superfluous material of no real significance in general education, when the cry for real general knowledge subject matter is so great.

What there is of education in tool processes and in knowing materials is learned during the first third of exploration, and that, we all earnestly agree, is important general education. What follows is repetition, a vocational method contributing little to general education. Repetition of processes already learned to the satisfaction of general knowledge merely invites student rebellion against the slow and obsolete grind into finer particles of knowledge interesting a very negligible percentage of citizens when one considers the fact that the best skill training in the industrial-arts set-up is

but one part in ten thousand of the current industrial specialized procedures, the most of which have little or no connection with the subject matter and method taught today.

The need for industrial arts is as great as ever, but it will fail unless its offering at this most critical juncture is revised to replace much of its present material with that which is designed to supply the citizen with experiences in areas of glaring public misunderstanding today.

For example, it is natural and ultimately imperative that the industrial-arts department furnish the American people with a clear general view of industrial organization, together with a vivid picture learned by *doing*, of the problems in competitive manufacture. They should also know the essential facts in the difficult field of competitive selling, even only to come face to face with the requirement of quality and design. Further, the people of the nation have a right to know at least the elementary facts in structural and other engineering, since the world around them is impregnated with general helplessness and wondering about these common matters. Civic reconstruction is another subject, about which the public is grossly ignorant, at a fabulous loss to the nation.

All of these subjects are particularly adapted to the industrial-arts *doing* method, in a way that is amazing to those who have seen it in operation.

In any case, for the newer projects and in all departmental effort, design is the *value* element. Projects are built for a limited technological purpose and they are static by comparison. They miss the point and the potential of industrial arts. If there is no purpose in industrial arts beyond the obvious, the work is destined to stop at a dead end. By means of *ideas*, however, born of inner consciousness, the material functions of a shop are given life and motive force.

The technological aspect of industrial arts begs for balance with the inner consciousness present in everyone. This reality has a boundless, spiritual character. Conscience is evidence of this. Along with its phenomena come feelings that compliment certain music, color, form, rhythm, texture, material, etc. The common human reaction to them cannot be merely brushed off as material, when their origin is extra-material. Man is greater than the picture the eye sees of him. Design is a phase of this greater consciousness. It is in fact an expression of man's boundless inner world. True, this view reaches beyond the ordinary materialistic-technological concept and its accompanying ego-centered myopia, and the persons bound by it will want to say "Let us keep our feet on the earth." Yet, let him examine and learn that the breadth of man's inner life is incalculable, and only as he expends it does he accomplish the socially esteemed work of the ages. The Parthenon is not the work of a mason, nor is Rheims Cathedral the product of a materialistic brain. Indeed, there is a Rheims within every man. Even when the master technician works his magic on an amazing scientific problem, he is motivated by a higher knowledge, which may be named *his balanced technological-aesthetic view*, the latter part of which is the inspirational motivating agent in all advanced technology. Let us not be so uncomprehending as to think it is brain or skill of hand.

The broad outlook is imperative if the industrial-arts teacher is to teach with authority. He must know his subject as he knows his hand: not its outer contour alone, or what the book says about it; he must know and feel its inner life and quality, not to be described in words. In relation to this knowing, partial knowledge is less to be desired than the confession of ignorance. Partial knowledge is not the truth; it stops short of reality. It is not even a portion of true knowledge; it is biased and warped and probably exaggerated in part, when it is out of its full setting and perspective. Even in that state, the bias is provable truth, and the person happy with little knowledge will argue with the blind man that the elephant is like a tree, from proof that the elephant's legs are sturdy and round. True knowledge is hidden from the blind of little or no understanding. Partial education is scarcely more than the dry bones of its factual framework. Such education teaches a fractional culture, which in the end, is a blight on our nation.

There is a ring of authority in true knowledge, that even a novice senses. He points his finger at the counterfeit, though he cannot say why.

The Practical Approach to Authoritative Design Knowledge

The understanding of design is a product of close association; long enough to recognize the true from the near true and the false. Whether this education is formal or not, it is still association. The boy learns about ballplayers and batting averages by close association and without benefit of school. A business auditor becomes an authority in his realm, not by formal training as much as by the exigencies of his office, and by intimate contact with the urgent facts of his problem. This is universally true.

An authority in design merely associates. He pays with time. The attainment is priceless, but it must cost time. Anyone may control time. Those who hide their disinclination behind false claims are the losers.

The design course to be given more or less regularly in this space is sure to lead the reader, if he will follow to the end, through the practical steps to a professional designer's viewpoint and status. The method, as given, is one pursued by practicing professional interior and commodity designers, although it must be admitted, their education was broad to begin with. However, a teacher's experience in the field is an asset, and he will succeed in his purpose with ordinary willing effort.

Fig. 1

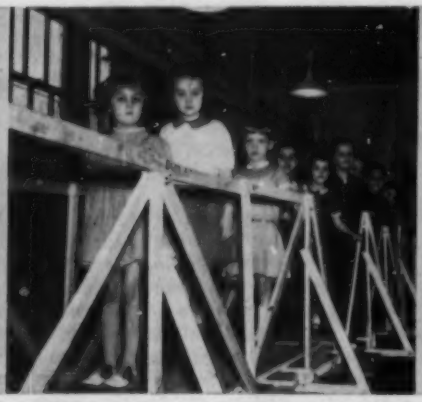


Fig. 2

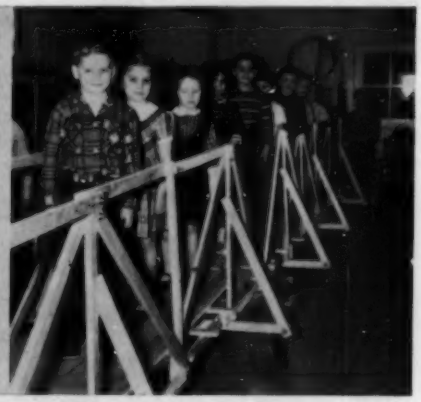


Fig. 3

Lesson 1

The equipment consists of merely an open, searching mind; self-discipline to the end; confidence in the end; and judgment to detect and separate the truth from a mass of detracting near-truths. Such judgment, being in fact the essence of the knowledge sought for, develops as the lessons advance.

Assignment Library Work

The work of the course revolves around source material to be found at any public or college library. Textbooks are not used in this course. Books, it is true, are substantial sources: they lend a certain atmosphere, and they contain written principles and comment by known authorities of the past — but of the past.

Current magazines, on the other hand are fresh, timely, up to the minute, selective, and discriminating. Next to live contact, they are, therefore, the preferred basic source material to be used.

Professionals, it is easy to see, depend on the magazine to furnish them with critical and professionally screened news from their world of creative endeavor, so that they may keep abreast of the times by knowing the thought of the trend.

a) Useful source magazines are listed somewhat in their order of importance:

1. Arts & Architecture
   3305 Wilshire Blvd.
   Los Angeles 5, Calif.
2. Design Quarterly
   Walker Art Center
   Minneapolis, Minn.
3. Interiors
   18 E. 50th St.
   New York 22, N. Y.
4. Domus (A Milan art publication)
5. Graphis (A Zurich publication)
6. O'Eil (A Paris publication)
7. Craft Horizons
   601 Fifth Ave.
   New York 17, N. Y.
8. Industrial Design
   18 East 50th St.
   New York 22, N. Y.
9. School Arts
   44 Portland St.
   Worcester 8, Mass.
10. Architectural Record
    119 W. 40th St.
    New York 18, N. Y.
11. Architectural Forum and House and Home
    (Both) 9 Rockefeller Plaza
    New York 20, N. Y.
12. Perspecta (A Yale Journal)
    New Haven, Conn.
13. Ceramics
    4175 N. High St.
    Columbus, Ohio
14. Print
    535 Fifth Ave.
    New York 17, N. Y.
15. House Beautiful
    572 Madison Ave.
    New York 22, N. Y.
16. House and Garden
    420 Lexington Ave.
    New York 17, N. Y.
17. College Art Journal
    432 Fourth Ave.
    New York 16, N. Y.
18. American Artist
    20 W. 40th St.
    New York 18, N. Y.
19. Art in America
    Weston Road
    Cannondale, Conn.
20. The Art Bulletin
21. The Studio
    432 Fourth Ave.
    New York 16, N. Y.
22. Arts
    116 E. 59th St.
    New York 22, N. Y.
23. Machinery
    93 Worth St.
    New York 13, N. Y.
24. Electrical and civil engineering magazines.

b) Manufacturers' brochures are useful when they are symptomatic of the trend. In fact, some of these may be said to be the trend. The current catalogues of

1. The Herman Miller Company of Zeeland, Mich.
2. Knoll Associates, New York.
3. Jens Risom Design, Inc., New York.
4. Directional Furniture Showrooms, New York.

For all of these, there is a printing and mailing charge.

c) To view trend creations firsthand is a distinct help. The work of mentioned manufacturers, as also that of artists reviewed in the above magazines, is worth any effort to see.

Required Work

The assignment consists of four weeks of work, the equivalent of two hours actual work, twice a week (not including time looking for material).

1. For lesson 1, arrange to be quiet and undisturbed. Leaf leisurely through the first source magazines. Confine observations to contemporary furniture and interior design. Avoid advertising except that of the firms named. Notice the accessories shown with this furniture, but do not be too concerned with them as yet. Give major time to the general appearance of tables, chairs, room dividers, and storage pieces. Do not allow yourself to form premature opinions, but try merely to absorb the spirit of the things shown. You may not discover the basic theory back of the design as yet, but later you will see, it expresses the age of the airplane and the far spaces very well. There is something simple and clean about it. Notice, too, that the new interiors express the same freedom.

2. For the second session, leaf through the same magazines, and see the same things, but find what you may have missed the first time, of spirit and general impression, and of character. For example, find in what ways the present air-minded age is recorded in furniture through its open spaces and through lightness of weight and of material. Notice how open and large are the spaces in contemporary home interiors.

3. Repeat this procedure for three weeks, varying the sources, but repeat the important sources. For the final thirty minutes of each two hour session in the third week, make pencil notes of your impressions.

4. During the fourth week, go into the library stacks, find the *design* and *art* sections, and look through books on related arts. Leaf through the newest books. Peruse such subjects as:

Graphic art	Painting
Fabrics	Art in Sweden
Furniture	German Bauhaus
City planning	Ceramics
Folk art	Mosaics
Perspective	Architecture
Silver work	Sculpture
Glass work	Finnish crafts
The modern home	Design method, etc.

Investigate leisurely. Try to discover the basic principle, and find that all contemporary creative work is related. Review as many subjects as time permits, but do not allow yourself to become lost, looking at illustrations. Examine them to evaluate their worth and their faithfulness to the idea of the trend. Do not consider traditional work at this time if you wish to avoid needless confusion. There will be time for comparison after you anchor your understanding thoroughly in the authentic work of today. Be sure that what you are reviewing are professionally accepted types. There is no present formula to guarantee which are the types. Their sure selection is one of the results of this study. At the outset, selection is a matter of sensing, or of more and more accurate recognition. Pass up "modern" painting and sculpture for another day.

Do some reading. In a quick survey, as yours is, read at least the first and last paragraphs of a chapter; sometimes more, if the subject demands it. Get the writer's reason and thought.

If you are deeply intent, and not adverse to a broader picture still, turn your *FM radio*, or your *Hi Fi* to Van Cliburn's beautiful playing of the *Tchaikovsky Concerto*, or to the *Boston Symphony's* playing of *Barber's Adagio for Strings*. Or hear Sibelius' *No. 1 Symphony in E Minor*. Find in them the beautiful play of tonal design with

its color of detail, balance, and movement, like any other organized design. Everything of creative quality in any specific age is related. It is for you to try to discover unity in the mode and essence of its expression to attain an understanding of the balanced view.

The photographs depict what is referred to in the beginning of this article as a proposed plan of general education.

Figures 1 and 2 demonstrate the building of a truss bridge to prove the strength of light materials when scientifically employed. The building and the testing provide a clear general view of familiar engineering which the public has a right to know.

The building of miniatures, illustrating a planned type of civic development, provides the public with a practical pattern of integration between areas of unlike purpose. This should be common knowledge if communities are to avoid blight and gradual disintegration.

Magazine and bookbinding clamp

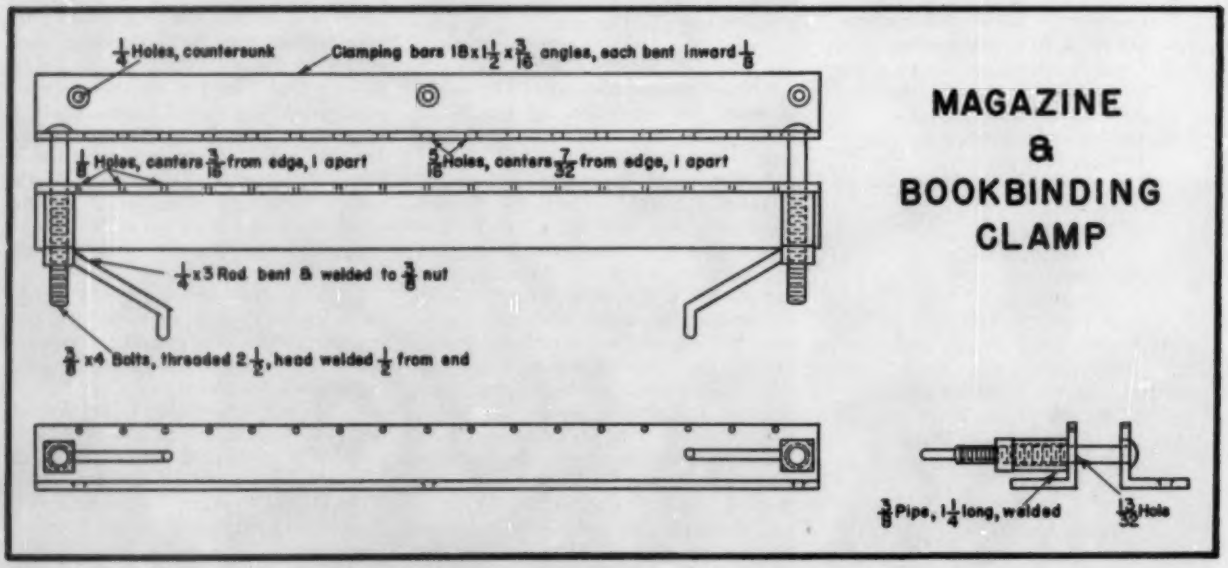
MAGAZINE AND BOOKBINDING CLAMP

M. H. ENSOR
Olathe, Kans.

The magazine and bookbinding clamp makes a good metalworking project. Besides using the hack saw, we find about 40 holes to be drilled and some to be countersunk. There is pipe to be cut, 6 places to be welded, using either the arc or acetylene outfit, bending and threading. The finished clamp can be secured to the edge of a table for use or if left loose it is turned upside down so the desired magazines can be inserted in the clamp and evened up by jarring all the backs against the table. After tightening the nuts, the clamp can be secured in a vise for drilling the holes with a 3/32-in. twist drill. By working from the side with the 1/8-in. holes little trouble is experienced in drilling straight enough to go through the 5/16-in. holes. The clamping bars straighten out when they are pressed down on a stack of magazines or a book and give uniform pressure all along the line.

After drilling, loosen the clamp and carefully raise the magazines about 1/2 in. to permit the lacing of a No. 6 linen or similar thread through all the holes and return, tying them with a square knot on the back.

It will surprise you how flexible your magazines will be and how easily opened. A professional binder might laugh at this when used on books, but I have increased the usefulness of many a book by tying all of its pages together by the use of this arrangement.


1/4 Holes, countersunk
Clamping bars 18 x 1 1/2 x 3/16 angles, each bent inward 1/8
1/8 Holes, centers 3/16 from edge, 1 apart
5/16 Holes, centers 7/32 from edge, 1 apart
1/4 x 3 Rod bent & welded to 3/8 nut
3/8 x 4 Bolts, threaded 2 1/2, head welded 1/2 from end
MAGAZINE & BOOKBINDING CLAMP
3/8 Pipe, 1 1/4 long, welded
13/32 Hole

Detail drawing of the magazine and bookbinding clamp

EXPERIMENTAL THERMAL FLASHER

E. A. RERUCHA
Franklin Park, Ill.

A cigar lighter element is used as the heating unit for operating this simple flasher or circuit breaker. The assembled device is shown in Figure 1 and the detail drawings of the various parts are shown in Figure 3. A diagram of connections for two-circuit operation is shown in Figure 2.

The parts are assembled on a hardwood base (1). The top edges are chamfered ⅛ by ⅛. Sand base smooth and finish with stain and varnish.

The expansion bar (9) consists of a strip of hard brass (15) and a steel strip (16) riveted together with small tinner's rivets (23).

Make all parts first and then assemble them on the base as shown in the assembly views of Figure 1. All parts are attached to the base with roundhead wood screws. Be sure to drill the proper size pilot holes for the screws as shown on the view of the base in Figure 1. Begin the assembling by mounting the porcelain receptacle in the center of the base using No. 7 by 1 r.h. wood screws (24). Arrange the other parts approximately as shown, starting with the bimetallic expansion bar bracket (13) and the terminal plate (14). All brackets are attached to the base with No. 4 by ¾ r.h. wood screws (3). The terminal screws for making connections are No. 8 by ⅜ r.h. wood screws (6). A No. 8 brass washer (5) is used under the head of each screw. Wires used for making connections should be placed and bent around the screw between the washers and the terminal plates.

Each terminal plate is attached to the base by means of four No. 18 flat-head nails ½ in. long (11). Pierce holes in the terminal plates with a sharpened nail or small center punch.

With a piece of No. 18 bare copper wire connect one terminal of the receptacle to the terminal plate (17) and the other terminal of the receptacle to terminal plate (12) as indicated by the heavy black lines in the top assembly view of Figure 1.

Figure 2 shows the wiring diagram for connecting the flasher to flash either one or two lamps. The 110-volt power supply is connected to terminals (12) and (14) by means of a receptacle plug and cord. If it is desired to flash only one lamp, the lower part of the circuit diagram is used, that is, the circuit starts, let us say, with terminal (14) which is connected to the power supply. It continues through the bimetallic expansion bar (9) to the contact points at end of bar and to the bottom contact screw (21) which makes contact through bracket (20) to terminal plate (18). The circuit then continues through the lamp and to terminal plate (17) through heater element and to terminal plate (12) and back to the line. We can thus see that the lamp, expansion bar, and the heater element are connected in series across the line and that the lights to be flashed are connected between the terminals (17) and (18).

If it is desired to flash two lamps alternately, the entire circuit as shown in Figure 2 is used. When the expansion bar is cool and in the down position it makes contact and closes the bottom circuit to the light as explained above. When the bar bends upward it closes the circuit between terminal (4), the lamp, and terminal (12), thus putting the upper light in the diagram across the line.

The operation of the device is as follows: The heating element is connected to the circuit shown in Figure 2 by means of the receptacle. It screws in like a fuse which it resembles. However, instead of a fuse link it has a small heating element which heats up when connected to 110 volts. Adjust the horizontal expansion bar so that it is about ⅛ in. above the surface of the element and the copper rivet contact at the end makes contact with the bottom contact screw No. 21 on bracket No. 20. As the element heats up, the bar is also heated. The coefficient of

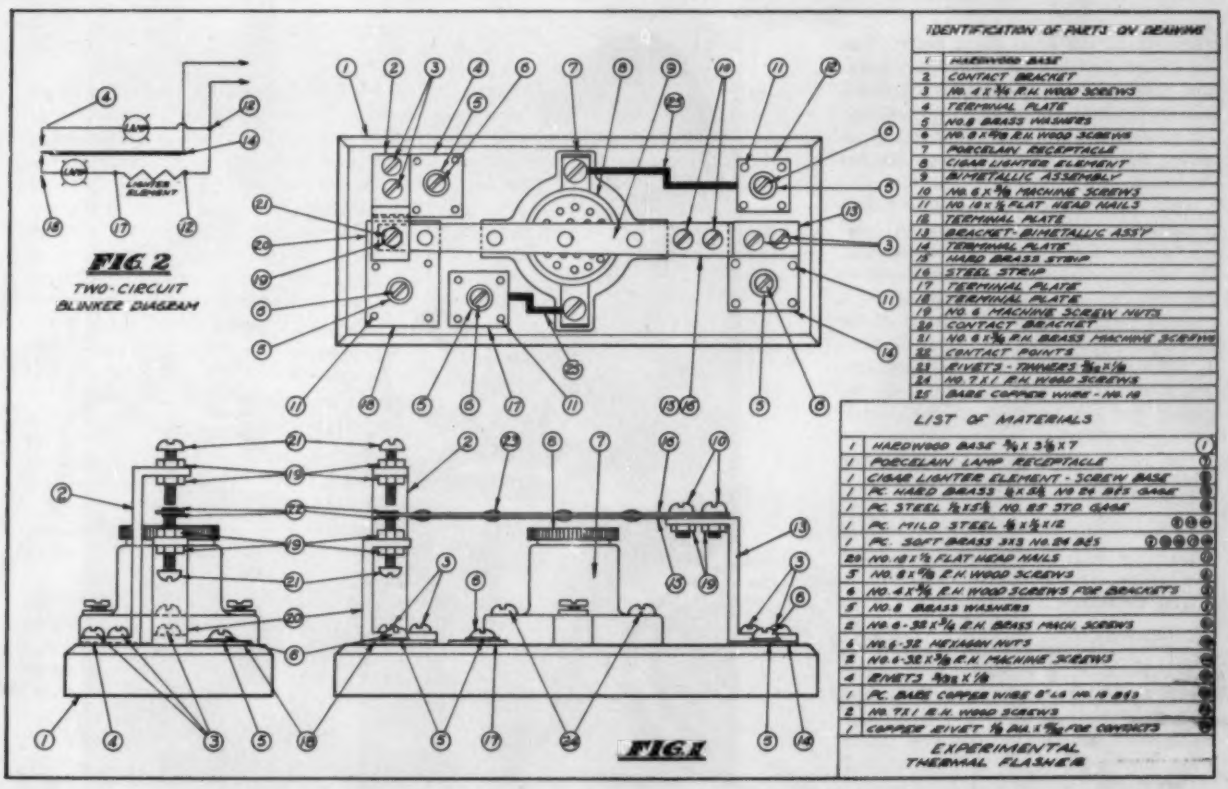


FIG. 2
TWO-CIRCUIT
BLINKER DIAGRAM
FIG. 1
IDENTIFICATION OF PARTS ON DRAWING
1 HARDWOOD BASE
2 CONTACT BRACKET
3 NO. 4 X ¾ R.H. WOOD SCREWS
4 TERMINAL PLATE
5 NO. 8 BRASS WASHERS
6 NO. 8 X ⅜ R.H. WOOD SCREWS
7 PORCELAIN RECEPTACLE
8 CIGAR LIGHTER ELEMENT
9 BIMETALLIC ASSEMBLY
10 NO. 6 X ⅜ MACHINE SCREWS
11 NO. 18 X ½ FLAT HEAD NAILS
12 TERMINAL PLATE
13 BRACKET-BIMETALLIC ASS'Y
14 TERMINAL PLATE
15 HARD BRASS STRIP
16 STEEL STRIP
17 TERMINAL PLATE
18 TERMINAL PLATE
19 NO. 6 MACHINE SCREW NUTS
20 CONTACT BRACKET
21 NO. 6 X ⅜ R.H. BRASS MACHINE SCREWS
22 CONTACT POINTS
23 RIVETS - TINNERS ⅜ X ⅛
24 NO. 7 X 1 R.H. WOOD SCREWS
25 BARE COPPER WIRE - NO. 18
LIST OF MATERIALS
1 HARDWOOD BASE ⅞ X 3⅛ X 7 (1)
1 PORCELAIN LAMP RECEPTACLE (2)
1 CIGAR LIGHTER ELEMENT - SCREW BASE (8)
1 PC. HARD BRASS ⅛ X 5/8 NO 24 B&S GAGE (15)
1 PC. STEEL ½ X 5/8 NO. 25 STD. GAGE (16)
1 PC. MILD STEEL ⅛ X ½ X 12 (17)(18)(25)
1 PC. SOFT BRASS 3 X 3 NO. 24 B&S (19)(20)(21)(22)(23)
20 NO. 18 X ½ FLAT HEAD NAILS (11)
5 NO. 8 X ⅜ R.H. WOOD SCREWS (6)
6 NO. 4 X ¾ R.H. WOOD SCREWS FOR BRACKETS (3)
5 NO. 8 BRASS WASHERS (5)
2 NO. 6-32 X ⅜ R.H. BRASS MACH. SCREWS (10)
6 NO. 6-32 HEXAGON NUTS (19)
2 NO. 6-32 X ⅜ R.H. MACHINE SCREWS (10)
4 RIVETS ⅜ X ⅛ (23)
1 PC. BARE COPPER WIRE 8" LG. NO. 18 B&S (25)
2 NO. 7 X 1 R.H. WOOD SCREWS (24)
1 COPPER RIVET ⅛ DIA. X ⅜ FOR CONTACTS (22)
EXPERIMENTAL
THERMAL FLASHER

Fig. 1. The assembled device. Fig. 2. A diagram of connections for two-circuit operation

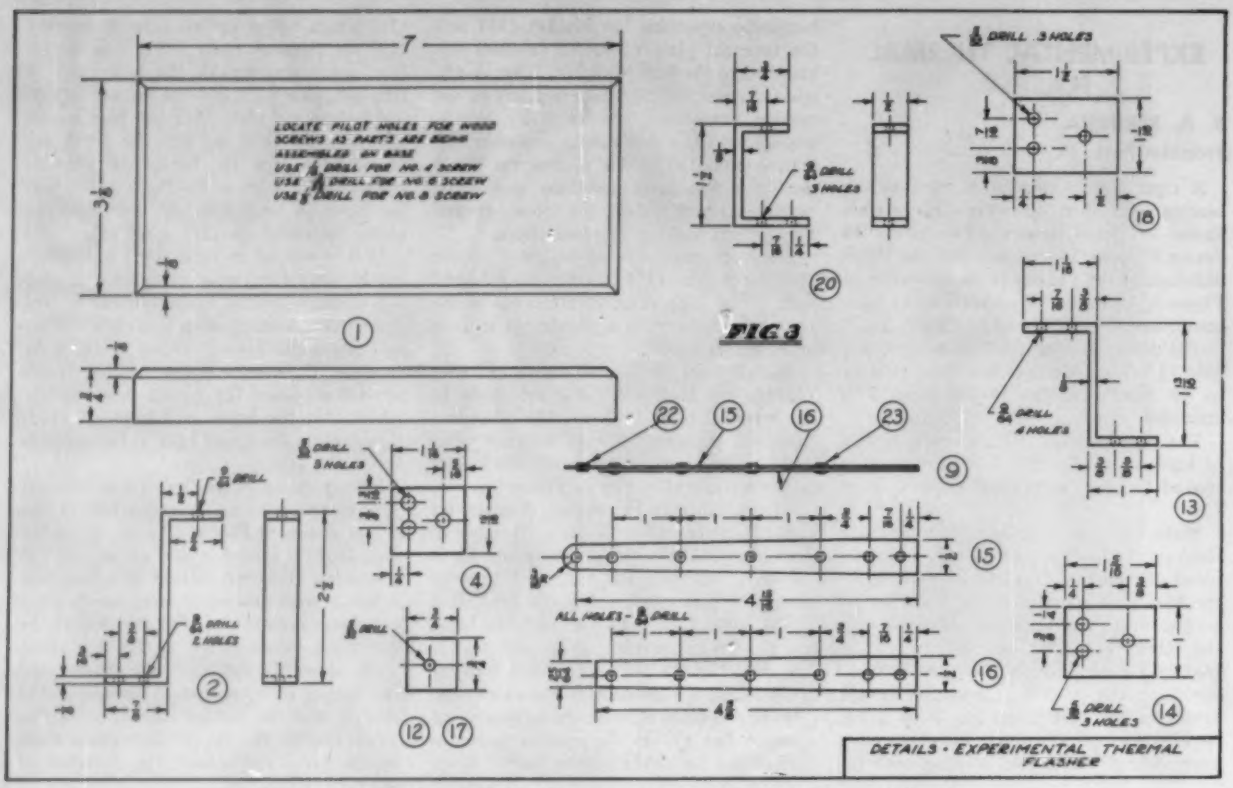

7
LOCATE PILOT HOLES FOR WOOD SCREWS AS PARTS ARE BEING ASSEMBLED ON BASE
USE 1/16 DRILL FOR NO. 4 SCREW
USE 5/64 DRILL FOR NO. 6 SCREW
USE 3/32 DRILL FOR NO. 8 SCREW
3 DRILL 3 HOLES
DRILL 3 HOLES
DRILL 4 HOLES
DRILL 2 HOLES
ALL HOLES - 3 DRILL
DRILL 3 HOLES
DETAILS - EXPERIMENTAL THERMAL FLASHER

FIG. 3

Fig. 3. Detail drawings of the various parts of the thermal flasher

expansion of the brass being higher than that of the steel will cause the brass to expand faster and the bar will bend upward, thereby breaking its contact with the bottom contact screw. This, of course, will interrupt the circuit. Upon cooling, the bar will return to the original position.

With two-circuit operation another light is connected between terminals (4) and (12) as shown in the diagram of Figure 2. The top contact screw (21) is adjusted so that the bar will close the circuit as it bends upward due to the expansion of the brass by the heat from the heater element. By adjusting both the top and bottom contact screws (21), the frequency of the making and the breaking of the circuits may be controlled.

The device may be used to operate lights and to do experimental work.

NAIL CANS

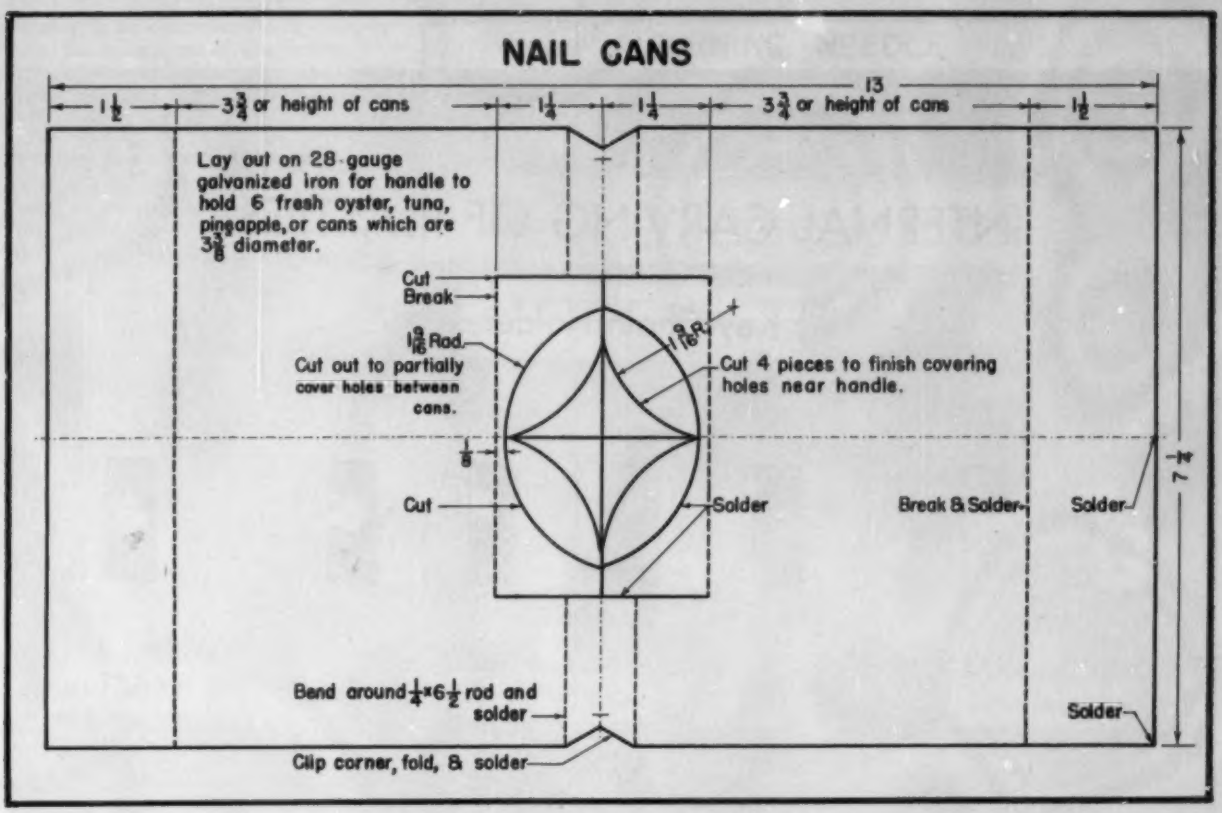
M. H. ENSOR

Olathe, Kans.

This project will be useful to the individual student or for use in the school shop. I have a couple of these nail cans which have been in use for over twenty years in our school shop. They are well beaten up but they are still serviceable.

Lay out the center support and handle

Nail cans



Detail drawing of the nail can project

on 28-gauge galvanized iron. Fold the sheet in the middle, but do not mash the two pieces tight together. Make two vertical cuts at the end of the hand hole with snips, then press the handle supports to one side in order to split the center section in two. The curve cuts are then made to fit on the top of the center cans. Save the cutout pieces to make four pieces to finish covering the holes near the handle.

Put rod in handle supports and with the vise, bend iron tightly around each end, clip corners, and fold over ends on the rod. It should be understood that the iron and rod should be bright and clean for soldering, likewise, all paint and lacquer of the cans should be removed and the metal brightened at the points of soldering.

Next, put the center section in the vise or suitable clamp and bend the two parts squarely out to cover the top of the center two cans. Then break the ends 3¾ in. or the height of the can used to support the weight of the cans.

Solder the cans together and solder around the cover of the holes, the edges of the handle supports, the ends of the handle and on top so the rod cannot turn. Hammer the bottom iron down tight against the bottom of the lockseam rim of the cans. Solder the two pieces under the handle and at the bottom of the box. Put a spot of solder in the middle of the bottom of each can, as well as fastening the cans together at the top and bottom. Last cut out the four little pieces to finish covering of the holes near the handles and solder in place on top of the outside cans.

You can now see how this unique handle is a practical sheet metal problem. When painted and labeled it looks like a manufactured container.

VISUAL AID FOR INTERNAL CARVING OF PLASTICS
A Key Chain Holder

ANTHONY L. MANNE
Asst. Professor of Industrial Arts
Chico State College
Chico, Calif.

Organization is an essential part of good teaching. The success of any course depends upon how effectively it is planned. In fact, organization is not only a function of administration but is also a method of teaching. Although organization is an important factor, it is necessary to employ additional techniques in teaching.

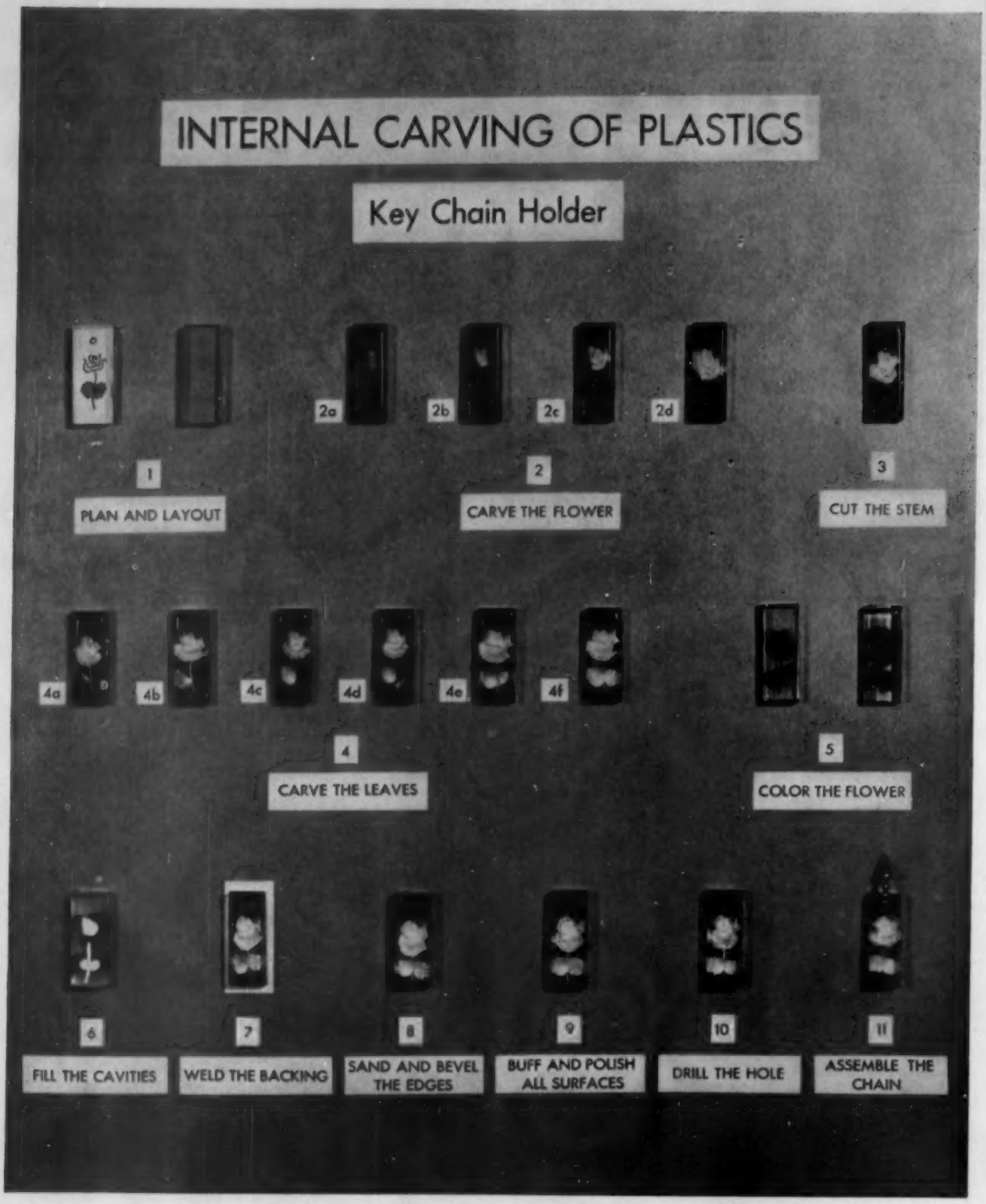
In all fields of education it is necessary for teachers to be well instructed in the proper use of the many teaching methods and aids, including visual aids. This is especially true in the fields of industrial arts.

Visual aids are used to supplement the various methods of teaching, such as: the demonstration, lecture, and conference. These aids include films, charts, and models. The proper technique in introducing and using visual aids helps to clarify the lessons being taught by more effective use of the sense of sight, stimulate student interest, and motivate learning.

The purpose of this inexpensive and easy-to-construct visual aid is to illustrate progressive steps involved in the internal carving of plastics. This key chain holder has proved to be a very interesting and useful project to the students. Through its construction students learn the use of basic tools and operations involved in internal carving of plastics, the carving and working properties of plastics, coloring, welding, drilling, and polishing.

The method of internal carving must be carefully explained and demonstrated to the students. The high transparency of the acrylic plastic permits the various steps in the development of an internally carved design, which is actually a hollowed-out cavity, to be viewed in three dimensions.

The visual aid illustrated in this article is an indispensable aid to the instructor in his presentation to the students and to the


INTERNAL CARVING OF PLASTICS
Key Chain Holder
1
PLAN AND LAYOUT
2a
2b
2c
2d
2
CARVE THE FLOWER
3
CUT THE STEM
4a
4b
4c
4d
4e
4f
4
CARVE THE LEAVES
5
COLOR THE FLOWER
6
FILL THE CAVITIES
7
WELD THE BACKING
8
SAND AND BEVEL THE EDGES
9
BUFF AND POLISH ALL SURFACES
10
DRILL THE HOLE
11
ASSEMBLE THE CHAIN

student in his comprehension of a step-by-step procedure in the carving process.

The following materials, tools, and equipment were used in the construction of this visual aid:

Tools and Equipment

Pencil, try square, jig saw, ink pen, tapered drill, Handee grinder, brush, medicine dropper, belt sander, muslin buffing wheels, goggles, twist drill 18 in., and hand drill.

BILL OF MATERIALS

No. of Pcs.	*Material*	*Size*
21	Clear plexiglas	⅜ by ½ by 1½ in.
5	Black, opaque, plexiglas	1/16 by ½ by 1½ in.
	Mounting board	16 by 18 in.
	India ink, black	
	Coloring dyes — red, green, yellow, etc.	
	Laminating dye, black	
	Plaster of Paris	
	Ethylene dichloride	
	Tripoli compound	
	Bead chain	
	Labels printed with 48-, 36-, and 18-point Spartan Medium type	
	Dexall "hold-tite" glue	
	Rubber cement	

USE FOR OLD RADIO TRANSFORMERS

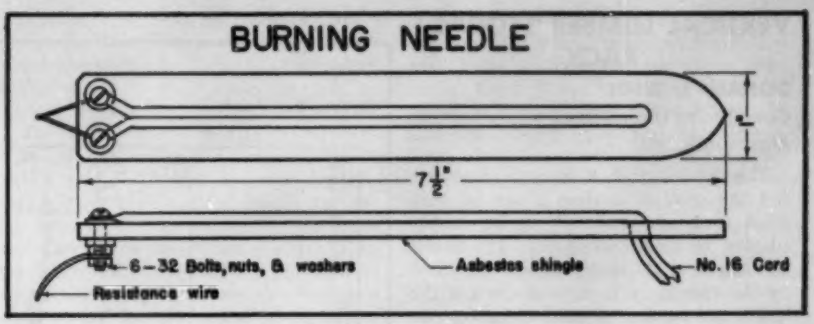
M. H. Ensor
Olathe, Kans.

Many radio sets with transformer type power supply have been discarded in favor of small a.c.-d.c. sets and television. In most cases, the transformer is still usable without repair. Radio amateurs often use the larger ones for power supplies for small transmitters but the majority are junked.

A person does not have to be a radio technician to make an autotransformer which will handle up to a kilowatt of power. The autotransformer is used chiefly for boosting or reducing power line voltage by relatively small amounts. It is undesirable for isolation of the output from the source. The section of the winding common to both the line and load circuits, carries less current than the remainder of the coil, because the line and load currents are out of phase. That is: the line and load currents in the common winding flow in opposite directions so that the resultant current is the difference between them. The voltage across the output is proportional to the turns ratio. Hence the common section of the winding may be wound of small wire.

To make an autotransformer from an old radio transformer, first, tape separately the high voltage leads. Then, hook the heavier low voltage section in series with the primary, followed by the lighter windings. In connecting up these windings, keep them in phase so that they will add to the line voltage. An AC voltmeter will be quite useful for determining the correct connection. If the connections are brought out to binding posts or bolts, the line and load connections can be easily made.

Different voltages are found on the secondary sections of old radio transformers which may not correspond to the one illustrated. To reduce the voltage, the line is hooked across all windings and the reductions are then about proportional to the increases.



Details of the burning needle project

Another use of an old radio transformer which is more thrilling to the younger boys, is the making of a burning needle outfit. The transformer low voltage windings should be brought out to terminals and hooked in series, keeping in the proper phase relation to add voltages. The high voltage leads are taped separately. The primary leads are fitted with line cord and plug.

The burning needle can be used for wood or leather burning, heating of stick shellac, sealing wax, beeswax, and even soldering. It is hotter than many commercial burning pencils. The handle is cut from a piece of asbestos shingle or siding. In one end a hole is drilled for securing the cord for the transformer. In the other end two holes are drilled to connect the cord to the burning needle which is made up from about 3 in. of resistance wire taken from an old toaster. Clip connections to the terminals on the transformer will permit different heats to be easily obtained. The length of the wire also determines the operating temperature. When a wire burns out it can be easily replaced. The burning needle will also operate from a six volt battery. It is not advisable to operate it from an autotransformer because of the possibility of shock.

By taking advantage of these transformers which are now being junked, one can turn them into useful projects for the school shop.

Autotransformer. See detail drawing on next page

VERTICAL LUMBER STORAGE RACK

DONALD L. BILEK
Community High School
Mascoutah, Ill.

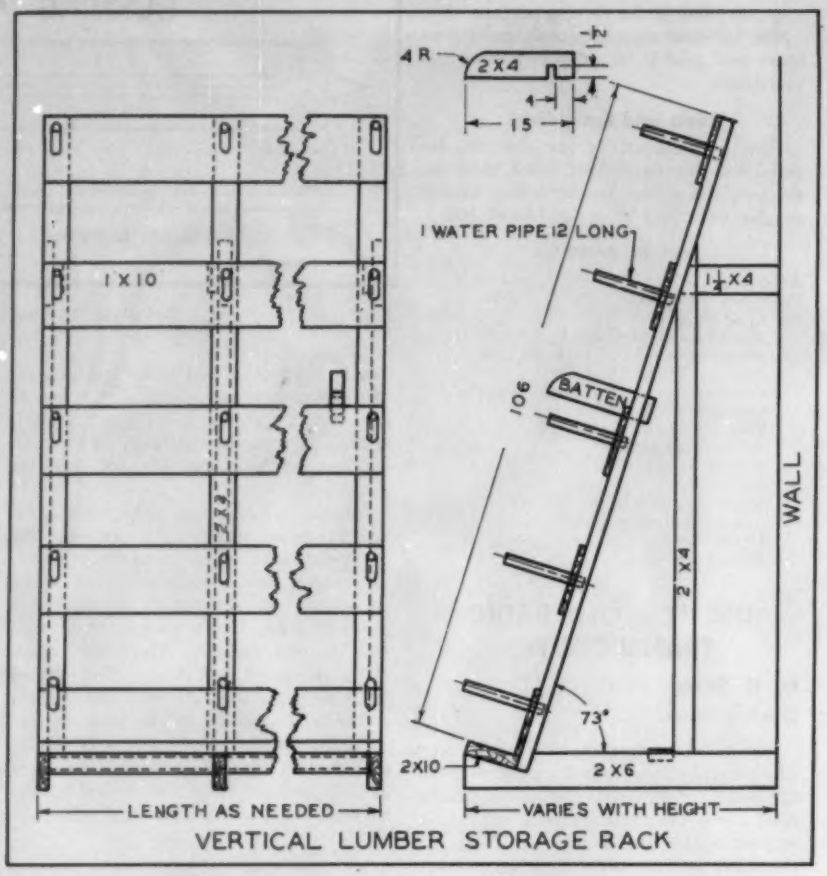
This lumber rack is easy to construct and the cost of making it can be held down to a minimum. It can be readily adapted to meet your needs. The length and height of the rack will be determined by the amount of space available and the length and amount of stock to be kept on hand.

The time spent in the selection of stock, for a project, is greatly reduced. No stock has to be removed or pushed aside to get at the piece needed. The student simply looks through the stock until the piece of his choice is found. Unused stock is replaced in the rack as easily as it is removed. This enables the boy to spend more time on the actual construction of his project.

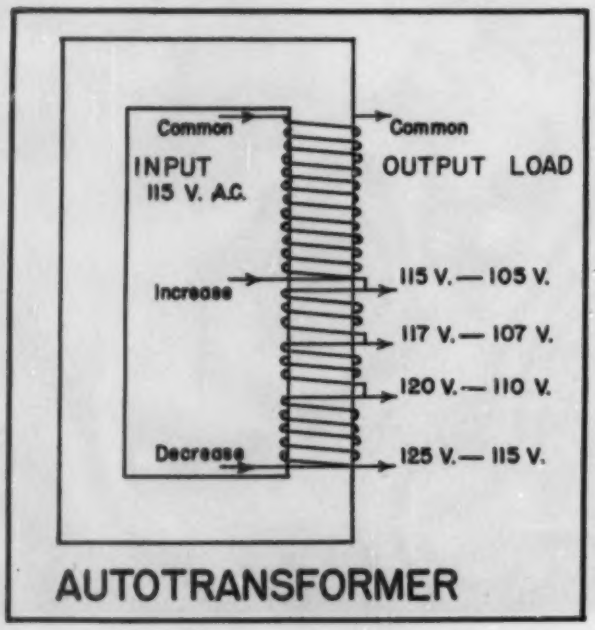
When the supply of stock dwindles, that part that is left has a tendency to fall to that side of the rack that is empty. This can be prevented by sliding the battens against the stock forcing it against the pipes. This will make a neater looking rack and also help to reduce warp and wind.

In stacking stock in the rack, care should be taken in placing wide boards against the pipes first and then work away with narrower ones.

Plywood can be placed in the space between the rack and the wall if the rack doesn't run the full length or width of the lumber room.



Details of the vertical lumber storage rack



Details of the autotransformer

TAP AND THREADING DEVICE

M. H. Ensor
Olathe, Kans.

The tap and threading device worked up by Robert McCreary won for him a place in the Ford Industrial Arts Award in the machine shop division. The threads cut by it on the adjusting screw of his spinning wheel helped it to take an Outstanding Achievement Award in wood turning.

When attached to any small screw cutting lathe, this device will make threads quickly, accurately and much smoother than using a stationary bit or screw box. The device can be made up to hold any small electric drill. One of high speed or a small router could be used in a similar way to do a better job. The lathe carriage moves uniformly, giving all threads uniform pitch which hand dies cannot produce. The speed of the drill prevents splintering of the threads.

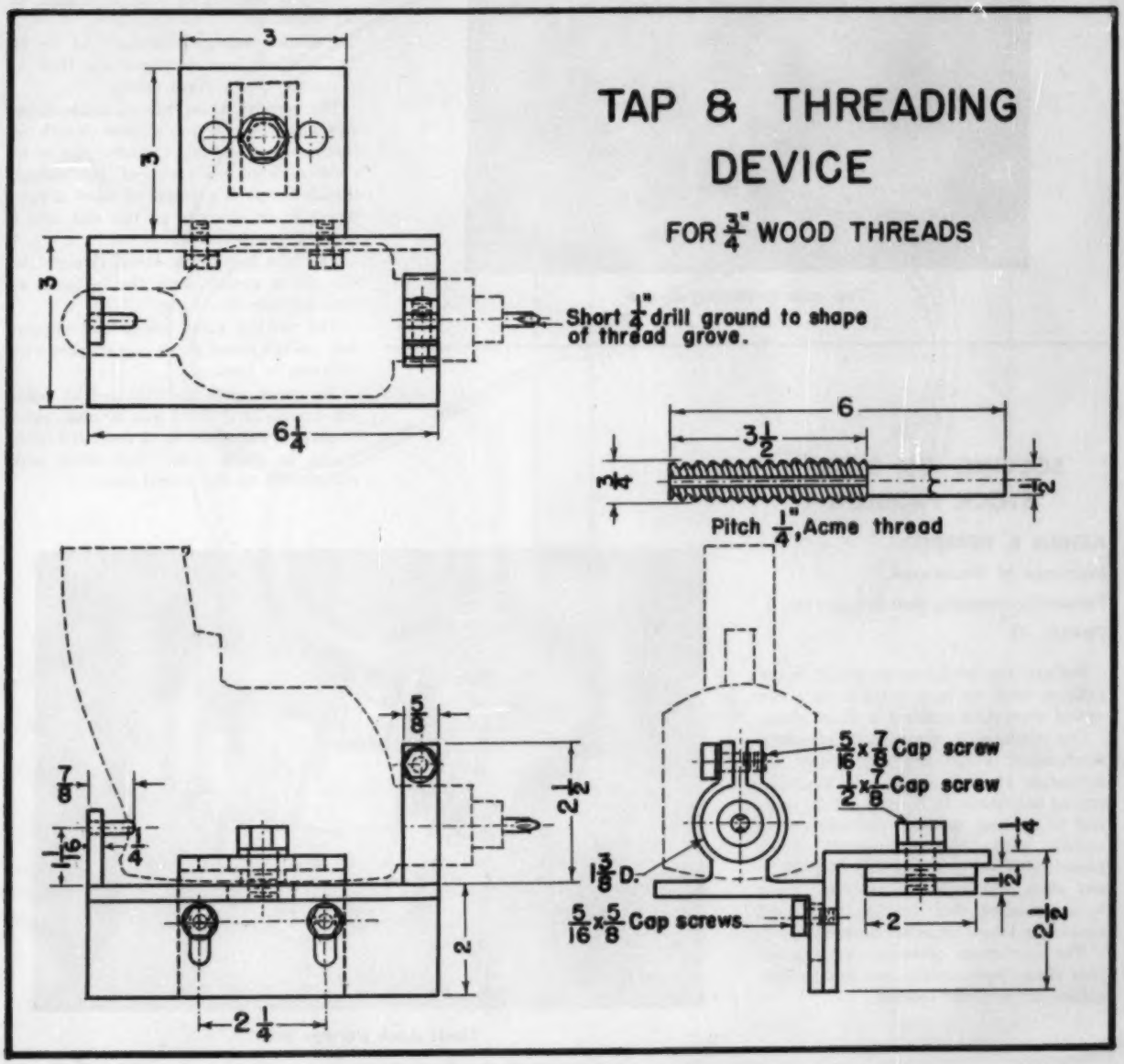
The drill base consists of a piece of 2 by 3 by ¼-in. angle iron. On it is mounted a pin and clamping collar to hold the drill in an inverted position. This is fastened by cap screws to a 3-in. piece of 2½ by 3 by ¼-in. angle iron, which is secured to the compound rest or cross feed with a ½-in. cap screw and threaded block made to fit the lathe being used.

The cutter bit is made from a short ¼-in. drill which is ground to shape of the thread groove desired. An Acme thread with the sharp corners removed seems to be most satisfactory.

When cutting threads, place the part in the lathe, and adjust the depth of cut and shape of bit by trial to fit a nut previously made by the tap. Set the lead screw adjustments of the lathe for cutting 4 threads per inch. Then place the lathe in slowest speed and back gear. Turn the countershaft pulley slowly by hand while the drill bit cut the threads.

The tap is made from a ¾ dia. by 6 in. piece of cold rolled or carbon steel. A 2½-in. piece is turned to ½-in. diameter before squaring sufficient length for the tap wrench. Threads of ¼-in. pitch Acme shape are cut on the remaining length. Then the headstock of the lathe is set forward, far enough to taper the end to a little less than ⅝ in. then the thread is cut to the complete shape. Four 3/16-in. flutes are cut across the threads with a hack saw, cutting in line with the radius on the lower side of the flute. The upper edge is cut at about 30 deg. inward slant. The flutes have to be cleaned often when cutting a thread. The small flutes and tapering end prevent chattering. The hole size before tapping should be 9/16 in. Another block clamped over the hole will prevent splintering, which sometimes occurs on starting or finish tapping of a hole. If the hole and rod to be threaded are coated with hot linseed oil before threading, splintering is lessened and less cutting lubricate is used.

Sanding of the threads on the rod can be done by following the thread grooves with a strip of sandpaper, providing the lathe speed is kept at a moderate rate. This method of cutting threads may also be used for cutting threads for regulating screws, clamps, and small vises.


TAP & THREADING DEVICE
FOR 3/4" WOOD THREADS
Short 1/4" drill ground to shape of thread grove.
Pitch 1/4", Acme thread
5/16 x 7/8 Cap screw
1/2 x 7/8 Cap screw
1 3/8 D.
5/16 x 5/8 Cap screws

Detail drawing of the tap and threading device. Photograph on next page

Tap and threading device

DRESSER LAMP

CARL D. SMUGOR
Industrial Arts Instructor
Royalton-Hartland Central School
Middleport, N. Y.

This is a multi-area project appropriate for most general shops. Its production encompasses various areas because of the nature of the materials and flexibility of choice.

Circular base: Keene's cement, wood, or metal

Vertical tubing: Brass, copper, or aluminum

Circular side: ⅛ by 1 in. band iron, or aluminum

"S" shaped insert: (Optional) ⅛ by ¾ in. band iron, or aluminum. Hole in center for vertical tubing.

The vertical tubing has an inside diameter large enough for a short length of continuous (electrical) threaded pipe to be sweat soldered into each end. Just enough threaded pipe is exposed to allow a light socket to be attached on one end, and a lock nut on the other.

The base has a hole bored through the side (or a groove along the bottom), to accommodate the wiring.

The vertical tube, insert, and circular side are reinforced at all contact points by soldering or brazing.

The metal parts are enhanced by peening, especially if band iron is used, prior to shaping and soldering, A suggested finish would be black paint, highlighted with emery cloth on the peened metal.

SOLVING THE SHORT STOCK PROBLEM

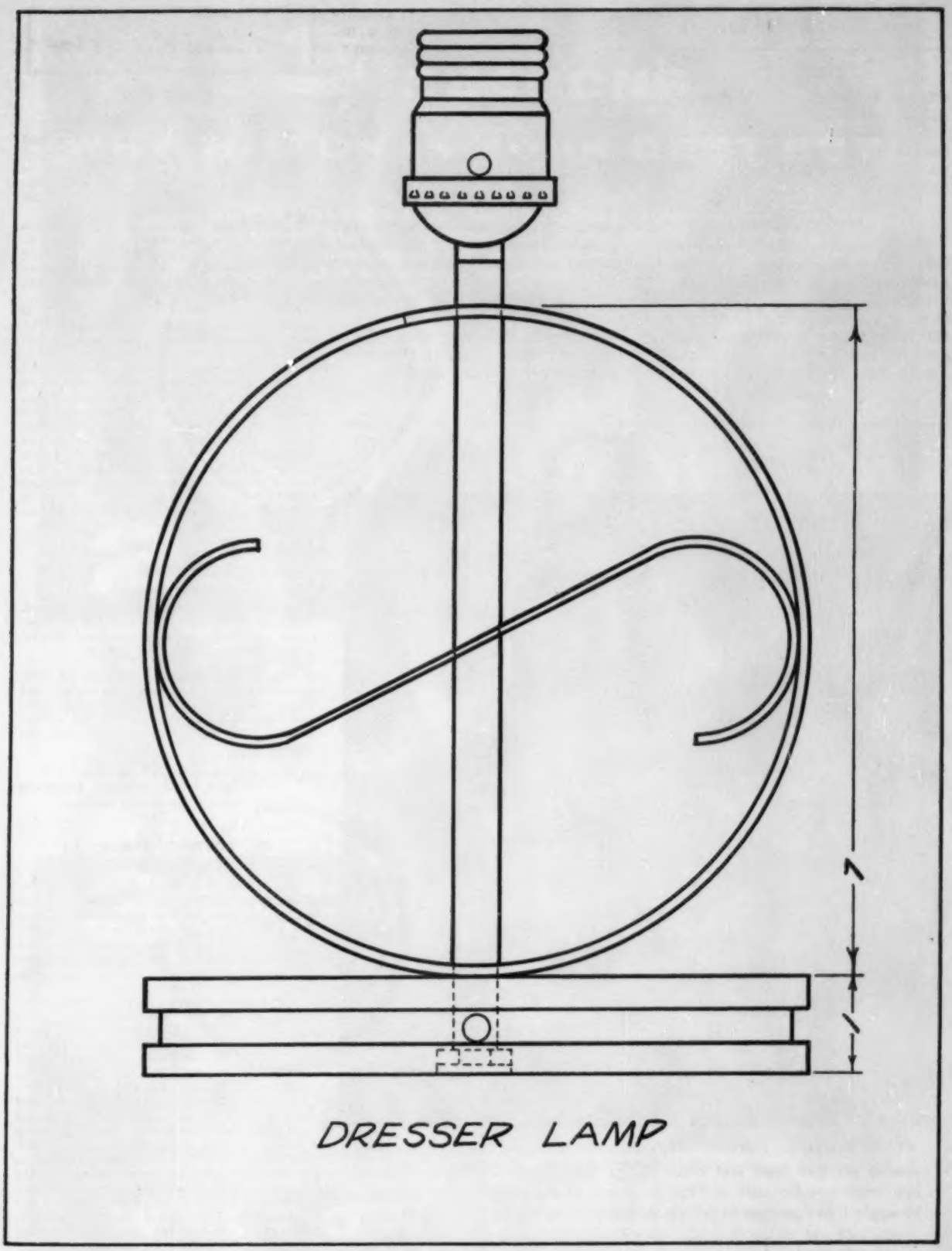
ARTHUR R. HERBERT
Instructor of Woodwork
Paxton Community Unit Schools No. 2
Paxton, Ill.

Perhaps you would be interested in the solution which we have found to the widespread short stock problem in school shops.

Our solution is simple and complete. Availability is the key requirement for utilization of short stock; and a simple, rugged box, about 10 in. deep, 42 in. wide, and 54 in. long, mounted on large rubber casters, meets this requirement. Short pieces of wood are regularly needed in any shop, and with this reservoir ready it is consumed, thus avoiding waste, and consuming longer materials more efficiently.

The illustration accompanying this article shows how expense and storage difficulties are removed together.

Short stock storage box



Detail drawing of the dresser lamp

TIME FOR AWAKENING

(Continued from page 178)

arts and its concern with the line, form, and color of industrial design.

Academic teachers need to try some imaginative planning and experimentation here. We will provide an important part of it.

Product Display

We can stand to take a lesson from industry on this subject. When they have something to show they show it with background and aesthetic finesse. If we as educators ever hope to emerge with prestige our educational exhibits must be more effective. In particular, I'm thinking of project displays in industrial arts. We have much to exhibit. Grouping a number of objects on a paper covered table is likened to a shelf where we store things. We need to dramatize our products with color, and background. A book entitled *"Display"* illustrates some of the ingenious ideas that were effective in dramatizing products in numerous parts of the world. The structures are very simple and basic and lend themselves to ideas on how we might present our projects. We have something to show, let's display it!

I wish to conclude with the thought that the above ideas and suggestions reflect only the beginning of what I hope to see in a series of new approaches to the industrial arts. We need to arrive, before too long, at a better realization of our subject and its important contribution to general education.

Larry Shade, an industrial-arts student from Bryan, Ohio, displays the dinette set that took first place in the Ford Motor Company National Industrial Arts Contests in 1958. It is one of the 40 projects in Modern Wrought Iron Furniture to be released in July by The Bruce Publishing Co.

Pictured with Shade is author Ned Frisbie, the boy's instructor at Bryan High School. — **Howard Smith**, publicity

Personal News

GOLDSMITH RECEIVES OUTSTANDING AWARD

J. Lyman Goldsmith, supervisor, Vocational and Practical Arts Section, Los Angeles City Schools, was awarded the Ship's Citation as the most outstanding leader in industrial education of California for the year 1959 at the CIEA convention in Stockton.

Each year, for several years, the Ship's organization has made this coveted award to our most illustrious and our most honored leaders. Those designated in previous years were Claude Nihart, Sam Fick, Heber Sotzin, Mack Grosse, and Lee Ralston.

William F. Nameny, of American Technical Society, when presenting the award, said: "The continuing contributions of these men are part and parcel of the history of industrial education of California not only in the Past and the Present, but also in the Future. This year's candidate is a worthy recruit to such distinguished company as he has already made his indelible mark upon the fabric of our industrial-education program. I know that you share with us our great respect and admiration for this man. Although the qualities of integrity, vision, energy, enthusiasm, ability and leadership may exist individually in others, in him they exist in combination to the highest degree."

The large beautiful plaque read:

CITATION

J. Lyman Goldsmith

Administrator, Teacher Trainer, Craftsman, Industrial Education Consultant, Author, Television and Radio Artist, Educational Motion Picture Producer, and Civic Leader.

In honor and grateful appreciation of your dedicated service, progressive leadership, and inspired vision in the fields of Industrial Arts and Vocational Education in the City of Los Angeles, the State of California, and the Nation.

Members of "The Ship"
California Industrial Education Association
Annual Convention, Stockton
1959

DR. DERTHICK SPEAKS AT NHSC MEETING

Dr. Lawrence G. Derthick, U. S. Commissioner of Education, was the principal speaker at the annual dinner of the National Home Study Council, Scranton, Pa., on May 12, 1959.

The dinner at which Dr. Derthick delivered the principal address, is one of the high lights of the annual three-day meeting which was held in Scranton from May 11 to 13.

The National Home Study Council, comprised of fifty-eight member schools, is the governing agency of private home study schools in the United States. More than 60 per cent of the 750,000 students who enroll annually in home study schools in the U. S., study with member schools of the NHSC.

A native of Kentucky, Dr. Derthick devoted more than 30 years to education as a teacher and educational administrator before becoming 14th U. S. Commissioner in Education in 1956. A graduate of Milligan College in Tennessee, Dr. Derthick earned his master's degree at the University of Tennessee and did graduate work at George Peabody College for Teachers, and Columbia University. He has had honorary doctorates conferred on him by six leading

(Continued on page 12A)

3 REASONS

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2 **WILTON'S PRODUCT IS DESIGNED TO WORK BETTER**—with more advantages and features than any other they're tops in quality. Because they cost no more than ordinary vises they're number one in value!

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WILTON MACHINISTS' VISES

3 **WILTON'S NEW MODERN VISE MANUFACTURING PLANT (the largest in the U.S.)**—Its up to the minute precision production facility practices what you teach. Wilton is educated to produce better products at the lowest possible cost.

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Gentlemen:
Please send me a FREE copy of the Wilton Shop Catalog.

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ASSOCIATION NEWS

(Continued from page 4A)

Edward Claude, chief of trade and industrial education for the State of Illinois, spoke at the banquet on "The Cut of Your Professional Cloth." He emphasized the importance of setting goals in life and to work toward achieving those goals. He pointed out numerous activities which students and teachers should participate in to improve their professional careers.

— Marvin Johnson, publicity.

WESTERN SUFFOLK INDUSTRIAL ARTS AND VOCATIONAL TEACHERS ASSOCIATION

The Western Suffolk Industrial Arts and Vocational Teachers Association was formed by a group of shop teachers, since the area of western Suffolk County had grown and contained enough shop teachers so the group could sustain itself independently. This group of shop teachers formerly belonged to the Nassau County group of Long Island Industrial Arts and Vocational Teachers Association.

The Constitution of the new group reads their purpose to be one to further the high ideals of industrial arts and vocational education in the public schools, and in order to secure the benefits and advantages derived from an exchange of professional views. To further their stated purpose the association holds a minimum of six meetings a school year. Meetings are slated for the last Friday of each month so actually there are more than the six meetings a year. The meetings are held at some member's school shop, a different school each meeting, with a business meeting followed by general interest discussion on such topics as methods of teaching, project idea exchange, demonstration of equipment by commercial suppliers, movies, slides, visits to local industries, etc.

The association held its charter meeting on March 28, 1958, with its present membership numbering 40 to 45, and about ten commercial subscription members.

Association officers are:

President, Thomas Putnam, Sachem Junior-Senior High School; vice-president, Earl Tyler, Bayport High School; treasurer, Charles Carter, Sachem Junior-Senior High School; recording secretary, John Fay, Islip High School; and corresponding secretary, Norman Hodul, Sachem Junior-Senior High School. — *E. S. Breda,* publicity, No. Babylon, L. I., N. Y.

Why Shop Instructors prefer **MILLERS FALLS BRACES**

It's easier to teach good workmanship with the best tools. That's why so many school shops use Millers Falls bit braces, the world's largest selling quality line. There's a model in every price range, and these fine tools are built to take rough shop use. They're precision designed — built for accuracy, smooth operation and long life. For economy as well as performance, *you can't beat Millers Falls bit braces!*

No. 1950

Unbreakable "Tenite" handle and head. Barber chuck. Forged jaws. A medium-priced shop favorite.

No. 1322

Boxed ratchet mechanism. Barber chuck. Self-opening jaws. Steel-mounted hardwood head with ball bearing action.

No. 732A

Self-centering chuck holds round (⅛" to ½" diameter) and square shanks. Another popular school shop model.

No. 772A

Boxed ratchet with ring shift. Lion self-centering chuck. Heavy nickel finish — polished and buffed.

MILLERS FALLS TOOLS SINCE 1868

MILLERS FALLS COMPANY

Dept. IA-47, Greenfield, Mass.

PERSONAL NEWS

(Continued from page 19A)

educational institutions, and is a member of four honorary fraternities.

A teacher and school official at the community level for many years before becoming Commissioner, Dr. Derthick served as superintendent of schools in Chattannoga, Tenn., from 1942 until his elevation to the top education post in the U. S.

In 1948, Dr. Derthick headed the Education Branch, Office of Military Government of Bavaria. In the international area he is a member of the U. S. National Commission for UNESCO; chairman, Interdepartmental Committee on Education Activities in International Organizations; and a member of the Fulbright Board of Foreign Scholarships.

In the professional field he has served the American Association of School Administrators in many capacities, including the presidency, and is a member of numerous educational organizations.

Last year Dr. Derthick directed a U. S. mission of ten educators on a 7000 mile tour of Russia to gain firsthand information about the organization and operation of Soviet schools and colleges. Information resulting from this mission played a vital part in the enactment by Congress of the National Defense Act of 1958 to strengthen the U. S. security through education. Under this act, Dr. Derthick holds important responsibility in the administering of federal funds for educational progress under state and local control.

DR. KENNETH W. BROWN

Dr. Kenneth W. Brown, director of industrial arts at the State University of New York College for Teachers at Buffalo, has been selected as "Man of the Year" in Industrial Arts Education.

Dr. Brown was selected for his work with the American Industrial Arts Association for which he has served as executive secretary for the past six years.

The international group of educators assembled at Long Beach, Calif., recently for their annual convention; it was here that Dr. Brown was selected as the man who has done great service to the upgrading of industrial arts on the national level.

SWARTS NAMED DIRECTOR OF I.C.S. HIGH SCHOOL DIVISION

Paul S. Swarts was appointed director of the High School Division, Education Department, of International Correspondence Schools, Scranton, Pa., on April 1, 1959.

A native of Dalton, Pa., Mr. Swarts is a graduate of Scranton Technical High School, received his Associate A.B. degree from Keystone Junior College, LaPlume, Pa., and his B.S. degree in Education from East Stroudsburg State Teachers College in 1948. He is

(Continued on page 16A)

Here's the latest in School Lathes!

Greater Strength
More Capacity
Maximum Safety

"OLIVER" No. 167
WOODWORKING-
METAL SPINNING
LATHE

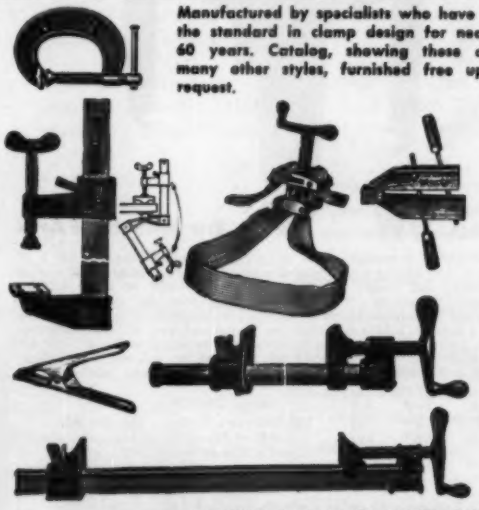
New speed lathe by "Oliver" features a completely new concept in design and construction. Welded steel construction, new manufacturing techniques make this the strongest, most rigid lathe on the market. Send for free color folder.

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

"OLIVER" — famous for Precision Machinery

"Jorgensen" TRADE MARK REG U S PAT OFF
and
TRADE "Pony" REG. MARK U. S. PAT. OFF.

CLAMPS



Manufactured by specialists who have set the standard in clamp design for nearly 60 years. Catalog, showing these and many other styles, furnished free upon request.

the clamp folks | **ADJUSTABLE CLAMP CO.**
424 N. Ashland Ave., Chicago 22, Ill.

Greater mechanical advantage of the

NEW DI-ACRO 36" SHEAR

brings safer, easier, more accurate shearing to the school shop

Easy . . . Fast . . . Safe Unique cam-lever drive of this new Spartan Model No. 36 Di-Acro Shear develops up to 6 times the shearing pressure of lever action shears. A 16 pound pull provides the same shearing force of a 100 pound "kick". This results in better control over material and machine for fast, easy handling with less chance for accident. Rugged steel construction provides distortion-free operation over full 36" width. Roller bearings bring the angled blade down and through material with a minimum of effort. An automatic hold down grips sheets for die-accuracy and prevents fingers from being caught in blade. Shears metals, plastics, meshes and all other shearable materials. Will notch and slit as well as shear. Write for new, fully illustrated folder.

DI-ACRO NOTCHER Rated at a 4-ton capacity, this Di-Acro machine will cut a 6" x 6" notch in 16 gauge sheet steel in one operation. Adjustable gauges locate notch. Write for details.

di-acro *Pronounced "die-ack-ro"*

O'NEIL-IRWIN MFG. CO.
351 8th Ave., Lake City, Minn.

Please send literature on new Spartan No. 36 Di-Acro Shear and Di-Acro Notcher.

Name_____
Name of School_____
Address_____
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Your Position_____

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Your shop needs a versatile AMF DEWALT®

for safer, easier student training

DEWALT is the machine your students are most likely to use after graduation ...it's smart to train them on a DEWALT now.

MODEL GA for Vocational Training

12- and 14-inch radial arm saws. 12" blade cuts 3½" deep, 14" blade cuts 4½" deep. Rips 28¾" wide, cross cuts 16" x 1" with standard arm. (Longer arm available.)

Uniform box-section non-retractable cantilever arm rotates 360° around the supporting column. Top-elevating crank. Quick-set miter locating latches at 0° and 45°. Eight (8) ball-bearing roller head rides directly on machined trackways inside arm. Direct-drive, totally-enclosed, fan-cooled motor (3425 r.p.m. full load), manual thermal switch. Calibrated miter, bevel, and rip scales, positive bevel-locating latches 0°, 45° and 90°. Steel table with legs, wood top. 14" diameter automatic safety guard with kickback device. (Select motor, saw blade and arm size from models shown below.) Power safety brake (optional).

Model	Std. Saw Blade	H.P.	Motor 3425 R.P.M.
GAK	12"	2	Single-phase, 60-cycle AC, 115/230 volts
GAN	14"	3	Three-phase, 60 cycle AC, 220/440 or 550 volts
GAQ	14"	3	Three-phase, 60-cycle AC, 115/230 volts
GAR	14"	5	Three-phase, 60-cycle AC, 220/440 or 550 volts

MODEL GW for Industrial Arts

10-inch radial arm saw, cuts 3" deep, rips 26" wide, cross-cuts 16" x 1". Uniform box-section non-retractable cantilever arm rotates 360° around the supporting column. Top-elevating crank. Quick-set miter locating latches at 0° and 45°. Four (4) ball-bearing roller head rides directly on machined trackways inside arm. 1½ h.p. direct-drive, protected, fan-cooled motor (3425 r.p.m. full load), manual key switch. Calibrated miter, bevel, and rip scales, positive bevel-locating latches 0°, 45° and 90°. Steel table with legs, wood top. 10" diameter saw and "Auto-float" safety guard with kickback device. Power safety brake (optional).

Model	Saw	H.P.	Motor 3425 R.P.M.
GW-1	10"	1½	120/240 volts, 1-phase, 60 cycles AC
GW-M	10"	1½	220, 440 or 550 volts, 3-phase, 60 cycles AC (Specify One Voltage)

AC 2-phase or 50 cycles available on request for GA and GW.

(For more information from advertisers, use the postcard on page 31A)

Let your local De Walt Dealer show you why De Walt is the safest, most efficient, easiest-to-use woodworking tool of all... how it makes *teaching* easier.

You need De Walt SAFETY. *Only the AMF De Walt® Power Saw* offers you such a combination of safety features.

Top-side cutting action lets the operator see the blade *and* the layout mark for every cut. Blade action holds the material down and against the fence for added safety. *Pull-across cutting* lets the operator move *with* the saw for most cuts, not against it as with other tools. *All controls are above* the table and clearly marked for safe, sure set-ups every time. *Original Safety Key Switch* prevents unauthorized use. *Work is always level* and moves in a straight line—you fit the *saw* to the *work*, not vice versa as with other tools. No balancing lumber at awkward and dangerous angles. *Exclusive tool guard* adds still greater safety—completely encloses shaper knives and other tools, yet adjusts to any size lumber in seconds. *Special De Walt Power Brake* stops saw blade in a few seconds for maximum protection. *Spir'Ator Safety Return* automatically draws motor and blade to a safe position when released.

You need De Walt EFFICIENCY. One De Walt Power Saw actually does the work of *12 different power tools*—and does each one *as well or better* than a single purpose machine!

As a saw, De Walt makes every possible cut, quickly, safely, with unsurpassed accuracy. Instantly adjusts to any miter, bevel, or compound angle—sets up for either right- or left-hand ripping. Allows repeated cuts from one marking. *With a dado head*, De Walt's *precision depth control* and *top-side cutting* give on-the-line accuracy for all cuts. *Full-tilting arbor* simplifies rabbeting, grooving, radius and saucer cuts. *As a shaper*, De Walt provides maximum flexibility by tilting, raising, or lowering to *any* desired position—gives a *full 50% more shapes per cutter.* And you have another rotary tool every time you attach a different head to De Walt's powerful direct-drive motor. *Your one De Walt gives unsurpassed efficiency for every cutting job.*

You need De Walt PRACTICALITY. No other single piece of woodworking equipment makes as much "sense" as a De Walt in your shop, because no other offers such practical advantages.

With De Walt's great versatility, you can often save the cost of a number of other machines which frequently stand idle. Your De Walt will be the most-used machine in the shop. The De Walt can be placed and operated *against a wall—takes up 75% less space than old style table saws.* And with a De Walt, you can be sure you are training your students on the kind of equipment they will later use. For De Walt is the choice of woodworkers throughout industry—for carpentry, construction, pattern shops, cabinetry, maintenance and crating departments—tried and proved by *millions* of operators.

You may have seen the De Walt Power Saw demonstrated at the National or your State Convention. If not, see your Dealer for a demonstration. Send the coupon below for your FREE copy of "Job-Tested Cutting Methods". Valuable new shop teacher's aid now available—"Easy Ways to Expert Woodworking"—just $3.95.

Another AMF Product
DE WALT POWER TOOLS

De Walt Inc., Dept. IA-96, Lancaster, Pa.
Subsidiary of American Machine & Foundry Company
Please send FREE Booklet—*Job-Tested Cutting Methods*
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PERSONAL NEWS

(Continued from page 12A)

continuing graduate study in Education at Bucknell University toward his Masters degree. He also holds a teacher's certificate from the Pennsylvania Department of Instruction.

Prior to joining the ICS High School Division in September, 1957, Mr. Swarts held a teaching position with the Lackawanna Trail Joint School, Factoryville, Pa., and also held administrative positions in Harrisburg and with the Naval Supply Depot in Mechanicsburg, Pa.

NEW FACULTY MEMBERS AT I.I.T.

Three new faculty members recently joined the staff of Illinois Institute of Technology, Chicago.

Anthony H. P. Skelland was appointed to the department of chemical engineering as assistant professor; and Neal D. Smith, Jr., was appointed instructor.

Alfred E. Attard was appointed an instructor in the department of physics.

DR. PAUL T. HISER

Dr. Paul T. Hiser, professor of industrial arts education, and supervisor of student teaching at State University Teachers College, Oswego, N. Y., has been elected vice-president of the American Council on Industrial Arts Teacher Education.

Dr. Hiser will serve in this post for two years. Council members are industrial-arts teacher educators from colleges in the United States, Canada, Australia, and Israel. The council is a division of the American Industrial Arts Association and the National Education Association. It sponsors and promotes the improvement of industrial-arts education in colleges and universities where teachers are educated.

As vice-president, Dr. Hiser will be chairman of the committee planning and conducting the annual convention programs for the next two years. He holds bachelor's and master's degrees from Ohio State University and his Doctor of Education degree from the University of Maryland.

An infantry major in World War II, Dr. Hiser has 21 years of service as a reserve officer. He holds a citation for meritorious service during World War II. He is a member of many educational and honor societies, including Phi Delta Kappa, Epsilon Pi Tau, the New York State Vocational and Practical Arts Association. In 1949 he was made a laureate member of Epsilon Pi Tau for outstanding service.

His teaching experience includes industrial-arts teaching in junior and senior high schools in Ohio. He was in charge of two of Ohio's experimental industrial-arts laboratories at Grove City and Oberlin for five years. He also served for two years as chief of personnel training for the Dayton, Ohio, Veterans Administration Center.

Dr. Hiser conducted a seven-year study at Oswego on the development and use of a pre-student teaching evaluation procedure in industrial arts teacher education.

He is the New York State representative of the American Industrial Arts Association.

NEW DIRECTOR OF CORRESPONDENCE SCHOOLS

Dr. M. Robert Allen has been appointed the third executive director of the National Home Study Council, effective March 15, 1959. Dr. Allen succeeds Dr. Homer Kempfer, who left last September. Helen Allion has served as acting director in the interim.

The National Home Study Council is the accrediting agency for private correspondence schools in the United States.

A copy of their *Directory of Schools* may be obtained by writing the *National Home Study Council, 1420 New York Ave. N.W., Washington 5, D. C.*

♦ Jesse D. Wallace, who has been teaching in Illinois since graduating at Murray, has accepted a position at Chico State College, Chico, Calif. He is teaching electricity and radio.

♦ William H. Middleton, a graduate of Murray who taught industrial arts at Flora, Ill., High School for five years, is now teaching at Ball State Teachers College, Muncie, Ind.

♦ Byron H. Bell, a graduate of Western Kentucky State College, is teaching industrial arts at Southern Junior High School, Louisville, Ky. He has completed his military service.

♦ John Marcus Helm is teaching industrial arts at Parkland Junior High School, Louisville, Ky. He is a graduate of Eastern Kentucky State College. He has completed his military service and before that taught for a short time in the Winchester school system.

News Notes

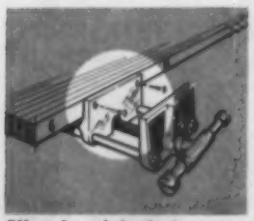
STOUT STATE COLLEGE SUMMER COURSES

A variety of new courses, the largest driver education program in the nation, and an out-

(Continued on page 18A)

vise no.	width of jaw inches	depth of jaw inches	jaw opens inches	wt., lbs.
10A	7	4	9 (12)	27
15A	8	4	9 (12)	28
20A	10	4	12	33

To mount, simply use mounting template and lag screws to pre-position and secure.



Slip *slotted* back jaw onto screws and tighten. Predrilled holes in back jaw face insure firm, flush fit.

MORGAN

So easy to mount . . . so easy to use . . . the MORGAN 10A woodworking vise.

In two simple steps . . . *in half the time*, the 10A, solid nut continuous screw model is on-the-job. New — improved *slot type* back jaw insures carefree mounting . . . no dismantling necessary.

This MORGAN, extra heavy woodworking model fits flush on all standard 2¼-inch bench tops. Adjustable front stop and aluminum handles (with ¼-inch, rubber bumper guards) standard; hardwood handles optional.

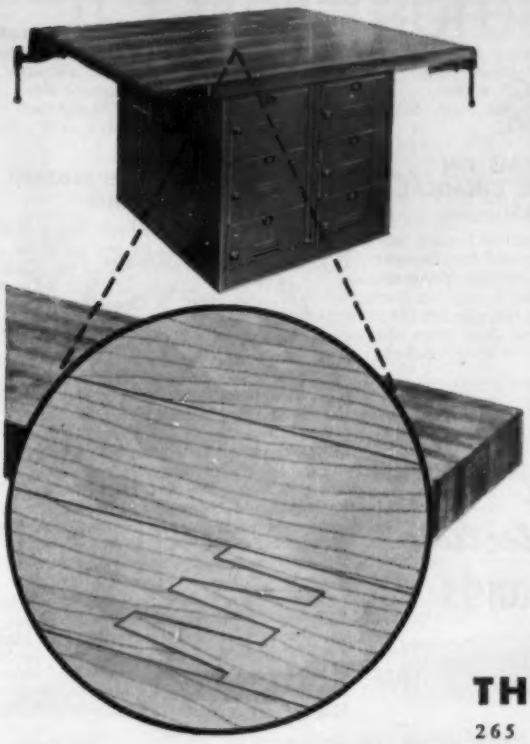
All MORGAN vises are fully guaranteed . . . backed by 65 years of engineering know-how.

Write for free catalog 133D of complete MORGAN woodworking, metalworking and machinist vise line.

MORGAN VISE COMPANY

120 N. Jefferson St. • Chicago 6, Ill.

(For more information from advertisers, use the postcard on page 31A)



TOLCO TOPS

FIRST AGAIN WITH A FINGER-JOINT THAT REALLY WORKS

"Finger-Jointing", developed by Tolerton after 2 years' research, permits use of **only** the best all-white, highly selected, premium Northern hard maple, **at no extra cost to you.**

Result? Tops with greater tensile strength, harder wearing surface and uniformly white color, since all imperfections can be graded out of the finished product.

First with many such product advancements, Tolerton proves again and again

"Tolerton does it best—first."

THE TOLERTON COMPANY

265 N. FREEDOM AVE. • ALLIANCE, OHIO

MAYLINE

GEM PEDESTAL TABLE

A Table to Fit Your Budget.

Five styles of tables from which to choose — in five price brackets. Let us help you furnish your classroom.

C7702 ART TABLE

C7703B DRAFTING TABLE

Symbol of MAYLINE Superiority

MAYLINE COMPANY

623 No. Commerce St.
Sheboygan, Wisconsin

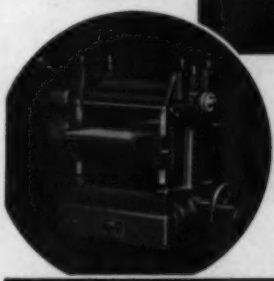
MAYLINE

PARKS PLANERS Give Your Students Practical Experience on Popular Industrial Machines

. . . the experience of working on the same type of high-speed planers they will eventually use in their trade.

20" THICKNESS PLANER

PARKS NO 20—A modernly designed, precision-built, high speed production surfacer that planes lumber up to 20" wide and 6" thick. Available with knife-grinder at additional cost.



12" THICKNESS PLANER

PARKS NO. 95 — A compact, sturdy thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive literature on both machines illustrated as well as on PARKS wood- and metal-cutting Band Saws, Radial Saws, Planer-Jointer Combination Machines.

The PARKS WOODWORKING MACHINE COMPANY

Manufacturers of Quality Woodworking Machines Since 1887

Dept. 22, 1546 Knowlton Street, Cincinnati 25, Ohio

(For more information from advertisers, use the postcard on page 31A)

NEWS NOTES

(Continued from page 16A)

standing schedule of convocations are expected to highlight the 54th annual summer session of Stout State College at Menomonie, Wis.

The regular six-week session will run from Monday, June 22 through Friday, July 31. In addition, a pre-session workshop on June 15 to 19 for vocational teachers, and a post session August 3 to 14, will be held.

Registration for the regular session will take place on Monday, June 22. Courses will be offered in all areas of home economics and industrial education.

Scheduled this summer in all areas of industrial education are 35 varied courses. Included are classes in photography, woodworking, plastics, metalworking, drafting, auto mechanics, electricity, graphic arts, and industrial technology. Credit in Advanced Technical Problems will be given in the areas of general shop, woodworking, drafting, graphic arts, metals, and electricity.

In addition to these courses, a variety of liberal arts classes is being offered in speech, English, art, science, and social science.

Further information available from *Stout State College, Menomonie, Wis.*

CATALOG OF FILMS ON CHEMISTRY AND THE CHEMICAL INDUSTRIES

A catalog of currently available motion picture films based on chemistry and the chemical industry has been published by the Manufacturing Chemists' Association.

The 12-page booklet lists 155 selected titles with instructions for ordering them from the 51 producing organizations. The listings include a résumé of subject matter, running time and film size and denote whether the films are in sound or color.

According to the MCA, the compilations were prepared particularly for use by science teachers and other educators, although the films are available to other groups also.

Copies of the catalog may be obtained from the *MCA, 1825 Connecticut Ave., N.W., Washington 9, D. C.*

NORTHERN ILLINOIS STUDENT PROJECT FAIR

The second annual Northern Illinois Student Project Fair, sponsored by the Industrial Arts Department and Industrial Arts Club of Northern Illinois University, was held April 23, 24, and 25, 1959. Students from 55 junior and senior high schools entered 686 projects for competition. Awards in the form of ribbons and medals were won by students from 41 schools. The projects were judged on the basis of craftsmanship, design, and opportunities for student learning.

A new feature of the Fair was a series of demonstrations of industrial processes that could be used in industrial arts classes. O. J. Seeds, manager of Cerro De Pasco Sales Corporation, New York, demonstrated the use of low temperature melting metals; Mrs. Cornell Woods and John Evans of the Evanston Ceramics Company, Evanston, Ill., demonstrated the use of mosaic tiles; and a group of university students demonstrated anodizing of aluminum, injection molding of plastics, and vacuum forming and free blowing of plastics.

Dr. George W. Senteney, assistant professor of industrial arts, Northern Illinois University, was the general chairman of the Fair. Ronald Hughes was student chairman.

PUSH BUTTON Speed Selection

from to in seconds

or to *any* intermediate speed, *instantly*

Teach modern methods with these strictly modern lathes that eliminate all hand belt shifting and deliver even the new high speeds with the touch of a button.

It's that easy!

The work is done by a motor driven speed changer. It accelerates or slows the lathe to any desired speed in seconds. With a 10:1 ratio, this new variable drive makes it easy to select from a wide range of speeds—200 to 2000 rpm in direct drive and 40 to 300 rpm in back gear.

Maximum stability and smooth power transmission are assured because the drive unit is oversized. All pulleys and shafts are fully supported (eight bearings). Double V-belts throughout the drive eliminate slippage and deliver full power to the spindle. Because of this rigidity and extra pulling power, this lathe will take heavy cuts at all speeds and precision finish cuts at high speeds.

It is a precision lathe moderate in price with the versatility for safely teaching both beginning and advanced students.

SHELDON Variable Speed PRECISION LATHES

Write for

"Variable Speed" Circular and General Catalog showing . . .

•

10", 11", 13" and 15" SHELDON Precision Lathes (Bench, Pedestal and Cabinet types)

•

13" and 15" SEBASTIAN Geared Head Lathes

•

SHELDON Milling Machines

•

SHELDON Back Geared Shapers

Instructors: Write for Catalog and schedule of Sheldon Teaching Aids.

Illustrated WM56P 13" Swing- 34" Centers Base Price F.O.B. Factory

$2146.00

Less Chip Pan and Electricals Also available with 11" Swing

SHELDON MACHINE CO., INC.

4244 N. Knox Ave. • Chicago 41, Ill.

Business and Personal News

BLACK & DECKER ANNOUNCES A SUBSIDIARY

Robert D. Black, chairman of the board and president of The Black & Decker Manufacturing Company, Towson, Md., announced recently the formation of a subsidiary, Master Power Corporation, that has acquired the operations of the Master Pneumatic Tool Company, Inc., of Bedford, Ohio, and Master Pneumatic Tools (Canada), Ltd., of Toronto, Ont., Canada. The acquisition has been financed by the issuance of 37,004 shares of the capital stock of Black & Decker.

Operations of the subsidiary will be under the direction of Leonard J. Roll, vice-president and general manager. Mr. Roll was formerly secretary-treasurer of the Master Pneumatic Tool Co., Inc. Harry L. Williamson, Jr., former manager, Special Products Division of Black & Decker, will become general sales manager of the new Master organization.

STARRETT APPOINTS NEW SALESMEN

The L. S. Starrett Company announces the appointment of four new salesmen to its sales staff.

D. F. Richards will serve in the Cleveland territory under F. G. Rist.

W. E. Gillis will be located in the Los Angeles branch under J. E. Holcomb.

W. E. Staveley moves to Atlanta, Ga., reporting to R. M. Peckham.

P. T. Wickham will locate in the Western New England territory under J. R. Boehm.

(Continued on page 20A)

...it takes more than field trips and blackboards...

The responsibilities of teaching the principles of Rotating Electric Machines are given new importance every time the advancement of U.S. (or indeed, U.S.S.R.) scientific knowledge is headlined.

The contemporary teacher needs more assistance than field trips and blackboards to fulfill the mounting expectations of Industry and the Military—and to allay public anxiety. A practical and real medium of "visual experiment" is a must for modern training in Rotating Electrical Machinery.

LEARNING BY DOING
There's a CROW COURSE for every Teaching Need!

Rotating Electrical Machinery—BEGINNING—Model 200 AC-DC motor and generator principles and applications.

Rotating Electrical Machinery—INTERMEDIATE—Model 250 Major Commercial Machines—thorough treatment of distributed windings and analysis of voltages and currents.

Rotating Electrical Machinery—ADVANCED—Model 700 Complete Rotating Electrical Machinery Laboratory; Theory, construction and operation of commercial motors and generators, AC and DC magnetos, interpoles, rotary transformers, sine-wave apparatus, etc.

Coordinated Teacher and Student Materials with Every Crow Course.

CROW

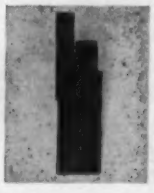
WRITE TODAY

UNIVERSAL SCIENTIFIC COMPANY, INC., Box 269, Vincennes, Indiana

HAND-WROUGHT IRON WORK IS *EASY*

with

Formit



3.50 **TOOLS AND MATERIAL**

Formit SCROLL DIE

Formit ALL

Anyone can create these beautiful projects without experience

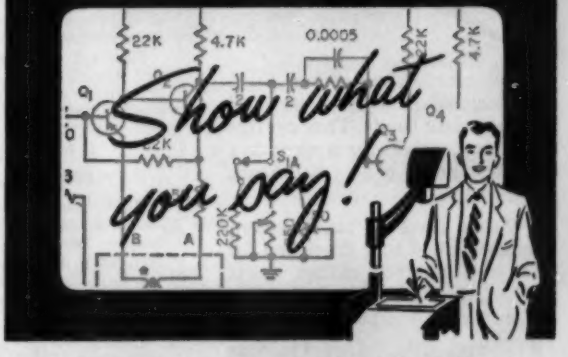
- Material is cold formed
- Join components by squeeze riveting
- Formit material is correct thickness for easy, accurate forming
- Formit tools have been especially designed to use this material
- Complete instructions with each tool
- Formit tools and material are not expensive

WRITE FOR FREE FORMIT DESIGN CATALOG AND PRICE LIST

TEACHER Formit FIRST

P.O. Box 5061
ALBANY 5, NEW YORK

HERE'S A NEW AND BETTER WAY TO TEACH



With The New **VU-GRAPH** Overhead Projector

It's unique! Beseler's new VU-GRAPH is the projector you use in a fully lighted room. The picture flashes OVER your head—onto the screen—while YOU face the class to see who understands, who needs help. Use prepared transparencies or quickly make your own. VU-GRAPH projects in black and white or full color: slides, stencils, models, even your own writing—as you write!

4 models including new portable. Teacher operated—no assistant needed. Free Demonstration at your convenience. Free Brochure: "Get Your Point Across—Fast!"

CHARLES Beseler COMPANY
EAST ORANGE, NEW JERSEY

(For more information from advertisers, use the postcard on page 31A)

ATKINS
Silver Steel
School-Shop Saws

- Inspire Student Confidence
- Require Less Maintenance
- Help You S-T-R-E-T-C-H Your Shop Budget

★ Genuine ATKINS *Silver Steel*, professional quality saws are sized to fit student hands. They cut free and easy . . . help the student do a job he's proud of . . . help make teaching easier.

★ *Silver Steel* is the strongest, toughest alloy ever developed for saws. Tempered blades resist abuse. Teeth hold their set; require far less sharpening.

★ ATKINS *Silver Steel* Saws cut straight and true . . . help reduce material waste. They last longer; release budget dollars for other tools.

ATKINS *also makes a complete line of regular-sized Silver Steel Saws for every wood-cutting job. Specify* ATKINS *Saws on your shop requisitions.*

ATKINS SAW DIV.
BORG-WARNER CORPORATION
Indianapolis 9, Ind.

BUSINESS & PERSONAL NEWS

(Continued from page 18A)

AMF DeWALT APPOINTS THOMAS M. GERAGHTY

Thomas M. Geraghty has been appointed assistant to the vice-president of sales for DeWalt Division of American Machine and Foundry Company, it was announced recently by Conde Hamlin, president.

In his new capacity, Mr. Geraghty will be responsible for the coordination of product distribution and field sales liaison activity.

He will make his permanent headquarters at the home offices of AMF DeWalt in Lancaster, Pa.

BROWN & SHARPE'S NEW SALES DIRECTOR

Arnold N. Hellewell has been appointed as Sales Director for Turret Drilling Machines for Brown & Sharpe Manufacturing Company of Providence, R. I. The Turret Drilling Machine line, along with jigless work positioning devices, were recently acquired through the company's purchase of Howe & Fant, Inc., of East Norwalk, Conn.

Mr. Hellewell, a former Brown & Sharpe apprentice, has been associated with the company's Machine Tool Division sales organization and has been located in the Ohio territory prior to the new assignment.

NEW PLANT AT SPRINGFIELD

Standard Electric Time Company, prominent manufacturers of clock and fire alarm systems, emergency lighting equipment, and voltage distribution equipment for laboratory use, have begun construction of their new plant at Springfield, Mass.

Celebrating its 75th anniversary this year, the company reports that the added plant space, made necessary by an increasing volume of orders, will allow modern in-line facilities to speed production and delivery.

Standard, the company which invented the first electric clock, was founded in 1884 in Waterbury, Conn., and moved to Springfield, Mass., in 1911.

J. H. MOSES NAMED TO SALES PLANNING POST

Appointment is announced of James H. Moses as manager of marketing operations for Eugene Dietzgen Company, Chicago manufacturer of drafting, surveying, and print making products. He will have responsibility for market analysis, sales forecasting, and sales personnel recruiting and training.

Mr. Moses, who is also chairman of the company's recently formed sales training committee, previously was supervisor of Dietzgen subsidiaries and central region operations manager. He will continue to make his headquarters at the firm's corporate offices at 2425 N. Sheffield Ave., Chicago, Ill.

NEW BLACK & DECKER SERVICE BRANCH IN MANHATTAN

To meet the increased demand for additional service facilities to users of their electric tool products in the Manhattan area, The Black & Decker Mfg. Company announces the opening of a new Factory Service Branch at 227 Varick St., New York City. Manned by factory trained personnel and equipped with a complete stock of genuine replacement parts for more than 200 different Black & Decker Electric tools, the new branch will supplement the service facilities of the company's present Factory Sales and Service Branch at 56-15

AMERICAN TECH
Publishers since 1898...

A STAFF OF EXPERTS at your fingertips

Teaching would be a lot simpler if, whenever a problem arose for which you couldn't find the immediate answer, you just snapped your fingers and a staff of distinguished authorities in the field assembled to help you solve it.

American Tech provides just such a staff, as near to you as your bookshelf. On a moment's notice you can turn to noted authorities for expert assistance on subjects of vital importance in today's demanding industrial world.

Here To Help You

1. *Layton S. Hawkins, Charles A. Prosser and J. C. Wright*
   Development of Vocational Education
   656 pages. 27 illus. $7.50
2. *M. Reed Bass*
   Fifty Hints for Teachers of Vocational Subjects
   58 pages $0.75
3. *John A. McCarthy*
   Vocational Education: America's Greatest Resource
   387 pages $6.00
4. *J. W. Giachino and R. O. Gallington*
   Course Construction in Industrial Arts and Vocational Education
   146 pages $3.75
5. *Charles A. Prosser and Thomas H. Quigley*
   Vocational Education in a Democracy
   576 pages $7.25
6. *Allen T. Hamilton*
   Research in Trade and Industrial Vocational Education
   49 pages $0.50

TEAR OUT AND MAIL TODAY

American Technical Society
Dept. W367
848 E. 58th Street, Chicago 37, Ill.

Please send me on-approval copies of textbooks checked below. After as long as 30 days of leisurely examination, I agree to either return them, or make remittance — less educators' discount.

1.... 2.... 3.... 4.... 5.... 6....

Name.....
Subject / Position.....
School.....
Address.....
City.....Zone.....State.....

(For more information from advertisers, use the postcard on page 31A)

Queens Blvd., Woodside. Sales operations of Black & Decker products will continue to be maintained at the Woodside Branch.

Dan E. Calabrese has been appointed assistant branch service manager of the company's new Manhattan Branch, which is under the over-all supervision of Walter Trapp, Black & Decker New York Branch Service Manager.

Descriptive Material

BRODHEAD-GARRETT 1959 CATALOG

Brodhead-Garrett Company have recently issued their 1959 Catalog of equipment and supplies for industrial arts, vocational education, crafts, and fine arts.

There are more than 15,000 items listed. Using a single reliable source for your class or shop needs will save you much time and trouble. A complete guarantee covers any purchases made from this book.

General products listed include art furniture, art materials, automotive equipment, benches, block printing, ceramic supplies, construction paper, crayons, drafting supplies, electrical supplies, files, foundry equipment, furnaces and forges, glue, graphic arts, grinders, hammers, hand tools, hardware and hinges, hardwood lumber, kilns, leathers and supplies, machinery, mechanical drawing equipment, metals, paints and varnishes, planes, plastics, pliers, precision tools, sanders, sandpaper, hand saws, screwdrivers, screws and fasteners, sheet-metal equipment, vises, and welding equipment.

(For further details encircle index code 0614)

MODERN SCHOOL SUPPLIES CATALOG

Modern School Supplies have announced their 1959 catalog of graphic arts and industrial-arts supplies for 1959. This 50-page booklet includes listings of their complete line of drawing sets, drafting instruments, design aids, drafting material, drawing equipment, shop tools, and craft supplies.

Catalog is available upon request.

(For further details encircle index code 0615)

BROWN & SHARPE BULLETIN No. M80

Brown & Sharpe's new Bulletin No. M80 is a combination Catalog and Price List showing the availability of the company's complete line of Precision Ground Tool Steel and Low Carbon Ground Flat Stock.

This 16-page bulletin describes characteristics and benefits of the exclusive "Ready Mark" Precision Ground Tool Steel, precolored blue for oil hardening and maroon for air hardening, and available at no price premium over the cost of plain tool steel.

The booklet also features a low carbon ground flat "Thrift Stock" which saves up to 60 per cent in cost over oil hardening precision stock for unhardened or case hardened parts.

Bulletin M80 may be obtained upon request.

(For further details encircle index code 0616)

SAMS PUBLICATIONS ANNOUNCED

Servicing Transistor Radios, Volume 3. Catalog No. TSM-3, 160 pp., 8½ by 11 in., $2.95.

Completely new, Volume 3 meets the increased demand for servicing information on transistor radios. It has two important sections.

Section One contains text and illustrations on "Techniques in Servicing Transistor Circuits," including such topics as "Comparison

(Continued on next page)

"I've found CLAUSING LATHES *PERFECT* for School Shop use!"

HERE'S PROOF OF PERFORMANCE: *"Clausing Lathes are rugged, accurate and easy to operate. They have many important and exclusive safety features and they're real values! I've found Clausing the perfect lathe for school shop use."*

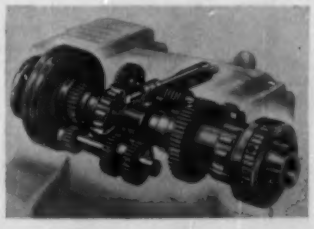
John Bendix, Asst. Prof.
Industrial Education Department
Western Michigan University

Headstock, apron and quick-change are totally enclosed . . . inquiring fingers can't get into these danger zones, nor can dirt or chips . . . all gears and shafts travel in a bath of oil. All controls . . . including those for back gear engagement . . . are located outside machine. Spindle nose is tapered Key-lock . . . eliminates danger of chuck run-off on braking or reversing.

Flame hardened bed ways for longer wear are standard equipment at no extra cost. Spindle is forged steel, turns on Timken "Zero-Precision" tapered roller bearings. Apron and quick-change gears are protected by safety devices . . . lead screw has easy-to-replace shear pin.

Drive is underneath . . . .no exposed belts or pulleys. Has heavy-duty ball bearing countershaft. Two V-belts drive the spindle . . . belts are outboard for easy replacement. Be sure to investigate the Clausing 6300-series 12¾" lathes before you buy any lathe for school shop use.

Quick-change box, too, is totally enclosed and gears and shafts turn in bath of oil . . . another important safety and long-service-life feature exclusive with Clausing in lathes of its class.



Enclosed construction of headstock provides greater rigidity, safety . . . longer service life. All gears, shafts and bearings travel in a pumped bath of oil.

CONDENSED SPECIFICATIONS

Swing over bed	12¾"
Between centers	21½", 33½", 47"
Hole thru spindle	1⅜"
Thread range	54 selections, 4 to 224 Standard right or left
Motor recommended	1 or 1½ HP, 1 or 2 speed

Write for Illustrated Literature . . .

CLAUSING

CLAUSING DIVISION
ATLAS PRESS COMPANY
6-121 N. PITCHER ST. • KALAMAZOO, MICH.

(For more information from advertisers, use the postcard on page 31A)

DESCRIPTIVE MATERIAL

(Continued from previous page)

of Transistor Circuits," "Coupling Between AF Stages," "Negative Feedback," "Power Output Stages," "Phase Inverters," and "Public Address Amplifiers."

Section Two provides complete photofact servicing information on 64 models, 33 chassis of popular transistor receivers. Photofact presentation includes Standard Notation Schematics, Resistance Charts, Cabinet and Chassis Photos, Alignment Instructions, Parts Lists and Replacement Data, and Dial Cord Stringing diagrams, where used.

ABC's of Transistors. Catalog No. TRA-1, 96 pp., 5½ by 8½ in., $1.25.

This book reveals the structure and function of the transistor in easy-to-understand terms. It describes the basic circuits in which transistors are used, easy methods for determining the correct polarity of voltages. The book is filled with useable and practical information as it applies to the servicing and testing procedures.

Marine Electronics Handbook by Leo G. Sands. Catalog No. MES-1, 264 pp., 236 illus., 5½ by 8½ in., $3.95.

This book gives complete service maintenance information on the various types of electronic equipment in use on both large and small marine craft. Equipment ranging from the radiotelephone and citizens band transceiver to sonar and radar gear is thoroughly covered. Two special 12-page fold-out maps chart the location of all shore-based transmitting facilities servicing the marine operation. Many schematics, together with valuable service tips, are also included.

101 Ways to Use Your VOM and VTVM, by Robert Middleton. Catalog No. TEM-3, 116 pp., 5½ by 8½ in., 100 illus., and photos, indexed, $2.

This book covers all of the common and many of the uncommon uses of the VOM and VTVM. A total of 67 special notes supplement the 101 uses described. The equipment needed, the connections required, the procedure, and evaluation of results are given for each "use" described. Some of the important uses cover: equipment checks, d.c. voltage tests, Ohmeter tests, signal-tracing tests, a.c. voltage tests, d.c. current tests, alignment applications, and color TV tests. This is a practical working guide for service technicians, hobbyists, students, and experimenters.

Replacement Guide for TV Controls. Catalog No. RGC-2, 100 pp., 8½ by 11 in., $1.

This new 1959 edition covers the replacement controls for over 22,000 models of TV receivers and for almost 900 models of auto radio. An exclusive industry number system offers easy selection of the proper and recommended replacements of these four replacement control manufacturers: Centralab, Clarostat, IRC, and Mallory. Elimination of duplicate listings, confusing cross-references, and prefixes make this guide accurate, easy-to-use and complete.

These books are sold through electronics parts distributors throughout the country, or available from Howard W. Sams & Co., Inc.

(For further details encircle index code 0617)

The NEWEST HAND-FED PRESS

THE C&P NEW MODEL-N PRESS is a COMPLETE PRESS (nothing extra to buy)

8x12 • 10x15 • 12x18

When a C & P NEW MODEL-N Press is delivered to your press room floor and the electrical connections installed, the press is ready to go—no extras to buy. Standard equipment includes everything needed from floor-pan to counter.

Many refinements are built into this thoroughly modern press, such as:

Adjustable bed track and extension roller tracks.

Silent drive for ink disc.

Variable pulley for speed control driven by constant speed motor.

Fully safety-guarded throughout.

Operating controls conveniently located.

New design enclosed front and sides with a modern machine tool grey finish.

Oil holes with red targets.

This Model-N is the finest hand fed press C & P engineers have ever designed. Write for complete description.

This illustration shows the adjustable bed tracks, the extension roller tracks and the impression counter with bracket.

This illustration shows the belt guard, the motor and expandable pulley.

Silent ink disc drive on all three sizes. Illustration above as installed on 10 x 15 and 12 x 18.

THE CHANDLER AND PRICE COMPANY
6000 Carnegie Avenue • Cleveland 3, Ohio
Manufacturers of dependable printing presses and paper cutters

NEW 1959 STACOR FLEX-MASTER CATALOG

Stacor Equipment Company have just released their new catalog for Flex-Master, a coordinated line of drawing and drafting equipment for schools. Lifetime quality equipment in wood, steel, and plastics is illustrated and described for art classes, engineering and mechanical drawings, vocational and industrial arts, shop, and school libraries.

Included in the catalog is an important new member of the Stacor line of drafting equipment — the imported UNIC drafting and drawing table, with precision engineered floating-board action. Stacor has exclusive distribution rights on UNIC for U. S., and possessions.

Also included are various combination units for multi-student use, flat drawer files, workbench locker bases, and the Stacor Visionaire School Library wood furniture.

Copies of the 16-page catalog are available from manufacturer.

(For further details encircle index code 0618)

X-ACTO GROUP CRAFT PROJECTS

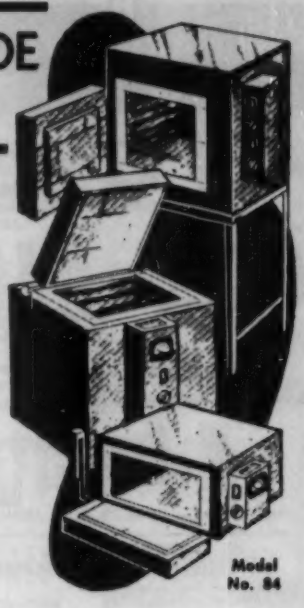
X-acto, Inc., manufacturer of hobbycraft kits and tools, have prepared a new folder which lists craft materials specially packaged for camp, school, church, hospital, or Scout group handicraft work. Ideal for summertime programs, X-acto project kits are made to provide dozens of useful gift and costume items easily completed by youngsters. Each craft has illustrated instruction manuals that permit leaders successfully to guide their groups.

The new illustrated folder lists economy-priced bulk packages and unit project assortments in the following crafts: Plexon Plastic Lacing for making lanyards, bracelets, earrings, barrettes, tie clips, etc.; Suji Wire Art for wire miniature figurines; Indian Beadcraft for rings, bracelets and belts; and Bamboo and Stringing Beads for bracelets, mats and toys.

Copies of the folder may be obtained by writing to X-acto, Inc.

(For further details encircle index code 0619)

THE MOST DEPENDABLE KILNS MADE AT LOWEST POSSIBLE PRICES



Model No. 84

STEWART CLAY COMPANY'S – Craftkiln

U. S. Registered

CRAFTKILNS beautifully finished in a green Hammer-tone, heat-resistant paint. They are available in five types to suit every ceramic need. Front Loaders, in both STANDARD and HI-FIRE models. Top loaders, in both STANDARD and HI-FIRE models, and METAL ENAMELING KILNS. Stewart will also build kilns to your specifications. Please write for complete information on custom kiln construction.

CHECK THESE CRAFTKILN FEATURES:

- Face Hardened Refractory Brick
- Guaranteed Elements and Switches
- U.L. Approved Components
- Pilot light on Models
- Nichrome or Kanthal Elements
- Manufactured to Exacting Specifications
- Economy of Operation
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Prices range from $12.95 up.

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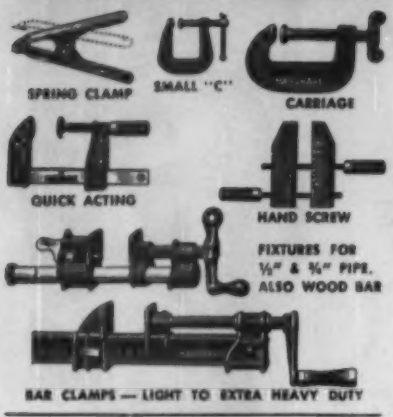

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Shop Equipment News

BROWN & SHARPE "HITE-CHEK"

Brown & Sharpe's new "Hite-Cheks" have been designed to eliminate chatter and other vibration in the transfer of dimensions set up by "Hite-Icators," Riser Blocks, Gauge Blocks, etc. Coupled with Brown & Sharpe's "Magna-Set System," they provide lowest cost-per-inch of any height setting and transfer arrangement.

Brown & Sharpe "Hite-Chek"

Utilizing a new lightweight, aluminum, tapered-box construction, uprights provide rigidity and stability in supporting any dial test indicator, in any position. Sturdy bases with hardened and lapped graphitic steel wear pads provide smooth, easy movement. Two-piece sliding heads permit quick rough settings, while positive fine adjustments can be securely clamped. Units are particularly suitable for use with high-amplification indicators.

Three standard sizes are available: 24, 36, and 48 in. high.

Write for Bulletin M-73.

(For further details encircle index code 0601)

SAW GUMMING ATTACHMENT

Mummert-Dixon Company have introduced a simple and practical saw gumming device. The attachment can be placed on any ordinary emery wheel stand and is fully adjustable for giving the saw teeth any shape and to suit the bevel on the emery wheel. A radially swinging arm is pivoted on a secondary arm which is adjustable to form the teeth properly and carries the saw to and from the emery wheel.

This attachment fits the company's No. 450, No. 475, No. 479, No. 481, and No. 482 Oilstone Grinders.

An 8-in. diameter ½-in. face emery wheel beveled to 30 deg., is best suited for this attachment.

Further information available.

(For further details encircle index code 0602)

SKIL'S NEW SAW DUST EJECTION SYSTEM

A new saw dust ejection system, which carries saw dust down to the floor away from the operator and also blows the line of cut clear, has been included on Skil Corporation's three new heavy-duty, ball-bearing industrial saws.

Another new feature is a push button blade lock to hold the saw shaft securely while making blade changes. Skil states that this

Skil's New Dust Ejection System

unique feature is not available on any other make of saw.

Blade visibility has been improved by a newly designed upper blade guard which allows absolute accuracy on critical cuts.

Other features include the Skil "Vari-Torque" clutch to protect against saw kickback and motor overloading, a nonbinding lower guard which retracts automatically on entering the work, plus depth and bevel adjustments that allow easy bevel adjustments or cutting depth changes.

Further information available.

(For further details encircle index code 0603)

GRAVERS FOR WOOD BLOCK CUTTING

Frank Mittermeier offers this set of 6 gravers, consisting of 2 round 3 and 10mm., 2 flat 2 and 10mm., Lozenge 3mm., wide, and knife. Tools are slightly bent for clearance of

Gravers for Wood Block Cutting

hand and to make it easier to work on curved surfaces. They are perfect for wood block cutting and engraving and general utility use.

Further information will be furnished on request.

(For further details encircle index code 0604)

NEW SAFETY BOTTLE CARRIER

The General Scientific Equipment Company has announced a new Safety Bottle Carrier, for safe, practical handling of chemicals in glass containers. This thick-walled polyethylene

(For more information from advertisers, use the postcard on page 31A)

container is available to replace leather or canvas carriers.

The GS Bottle Carrier has safety features designed into it. For ease in handling, the Carrier has a heavy wire handle sealed in plastisol and secured to integrally molded-on ears. The bottle, held firmly in place with a snap cover, is cushioned from shocks and breakage is prevented, thus eliminating the danger of accidents and injuries.

New Safety Bottle Carrier

This Carrier is sturdy; it can take punishment. It has been tested and has withstood hard use for over a year, without breakage of a single bottle.

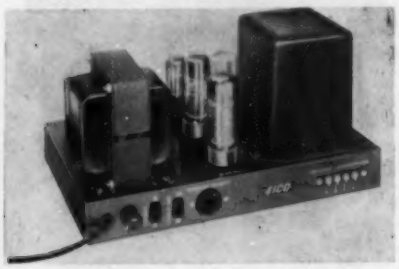
The unique features of the GS Bottle Carrier make it a necessity wherever chemicals are used.

Complete information may be obtained by requesting Bulletin 49.

(For further details encircle index code 0605)

NEW EICO 35-WATT ULTRA-LINEAR POWER AMPLIFIER

Electronic Instrument Co., Inc., has announced production of its new Model HF35 35-Watt Ultra-Linear High Fidelity Power Amplifier which employs a circuit very similar to that of the unexcelled EICO HF60 and HF50 Power Amplifiers, namely a low-noise



EICO 35-Watt Ultra-Linear Power Amplifier

EF86 pentode voltage amplifier direct-coupled to a 6SN7GTE cathode-coupled phase inverter, driving a push-pull EL34, tapped-screen output stage; the rectifier is the extra-rugged, slow warm-up GZ34 which eliminates high starting voltages and lengthens electrolytic and tube life. Stability and transient response are flawless and not degraded under speaker (including electrostatic) load, nor is there bounce or flutter under pulsed conditions. A standard octal socket is provided for powering the HF65A and HF61A preamplifiers. (The HF85 stereophonic Dual Preamplifier is now offered only with a built-in power supply.) The features of the HF35 are essentially the same as the HF50 except that the output tubes are self-biased.

Please write for further information and specifications.

(For further details encircle index code 0606)

NEW LINE OF SAFETY GOGGLE FRAMES

Watchemoket Optical Company, Inc., have introduced the Rapido Line of universal, custom-fitting safety goggle frames to accommodate plastic, glass, and prescription lenses. These new frames feature: (1) Patented Retrax Temples which wearer telescopes in or out for a perfect, comfortable fit; (2) a Universal Nosebridge which rests comfortably on any shape nose; (3) a Spread-End Frame which facilitates 60 second lens replacement. Rapido frames are available with or without side shields.

Additional features include: extra deep lens

New Safety Goggle Frames

channels to securely lock the lenses; nylon hinges for strength and durability; smooth temple hooks which rotate 360 deg.; and a choice of frame colors. Rapido frames are also available with plastic or hardened safety glass, clear or green, S7 lenses.

(Continued on next page)

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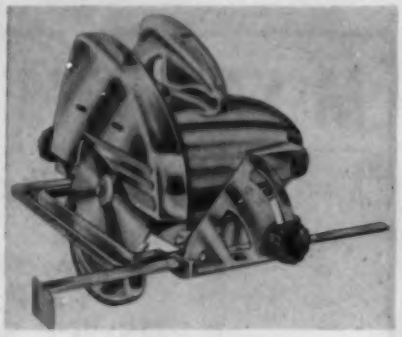
SHOP EQUIPMENT NEWS

(Continued from previous page)

Write for Bulletin 740 which is available from Eye Savers dealers or the manufacturer.
(For further details encircle index code 0607)

DALTON LINE OF "GOLD SEAL" POWER TOOLS

Dalton Manufacturing Company have introduced eight portable electric tools with a fine quality of construction and operating efficiency. Incorporating models for builders, maintenance men, home owners, and industrial users, each unit in the new Dalton "Gold Seal" line has been tested and approved by Underwriters' Laboratories.



Model No. D88 7-in. Power Saw

Model No. D88 7-in. Power Saw is equipped with a 1⅛-h.p. 110-115 volt a.c.-d.c. motor for effortless operation. Depth and bevel adjustments are quickly and easily made. The 7-in. combination blade cuts full 2 7/16 in., 2⅛ in., at 45 deg. The lower guard lifts automatically. A convenient grip handle allows user utmost comfort. Graduated rip guide is included.

A sturdy steel saw table is available for converting the 7-in. Power Saw into a table saw. It is complete with miter gauge and rip fence.

The Dalton "Gold Seal" line also offers the following models: Model No. D380 ⅜-in. Electric Drill with 3-wire cord; Model No. D500-2 ½-in. Electric Drill with ½-in. capacity in steel, 1 in. in wood; a heavy-duty industrial model with 3-wire cord, No. D500-3; Model No. D250-2 ¼-in. Electric Drill with ¼-in. capacity in steel, ½ in., in wood; a heavy-duty industrial model with 3-wire cord, No. D250-3; Model D44 Saber with adjustable base for bevel cuts to 45 deg., and capacity to cut 2 by 4s, complete with miter gauge and 3 blades.

Each electric drill is equipped with heavy duty ball thrust bearing and genuine Jacobs geared chuck and key. A lustrous mirror finish is a notable feature of all tools in the entire line.

(For further details encircle index code 0608)

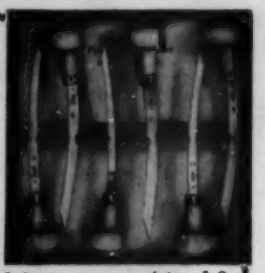
NEW CHALKBOARD DRAFTING MACHINE

Universal Drafting Machine Corporation have introduced their brand new Universal Tracmaster Chalkboard Drafting Machine, which quickly and easily measures and plots lines, angles, and curves with accuracy on the chalkboard.

This new drawing aid is especially helpful for teachers in mathematics, trigonometry, geometry, physics, chemistry, science, architecture, drafting, mechanical drawing, sheet metal, shop training, industrial arts, etc.

The Tracmaster drafting machine glides smoothly across the board, horizontally and vertically, with perfect balance and extreme

Gravers for WOOD BLOCK Cutting



This set of 6 gravers, consists of 2 round No. 3 & No. 10, 2 flat No. 2 & No. 10, Lozenge No. 3 knife. Tools are slightly bent for clearance of hand to make it easier to work. Top Quality Steel. Blades will keep sharp, keen edge and give a lifetime of service.
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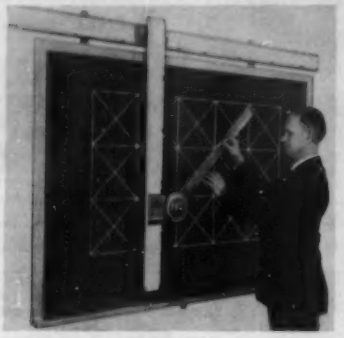
accuracy of angle and dimension. The protractor and scale rotate freely, locking in position at any drawing angle.



Universal Tracmaster Chalkboard Drafter

The Tracmaster is especially valuable for rapid locating and positioning of X-Y coordinates, establishing reference points, and measuring and drawing long lines. Numbered grid graduations are engine-divided every 10 in., along both horizontal and vertical beams, providing in effect a dimensional grid reference pattern. It provides full 360-deg. visibility of all angles, automatic 15-deg. indexing stops, a ball-bearing indexing head, and powerful baseline setting.

A special compass point locator or holder is provided at the end of the graduated scale. The Tracmaster chalkboard drafter installs directly to the wall above the chalkboard. Two special mounting brackets are included.

(For further details encircle index code 0609)

DEFT WOOD FINISH IN A SPRAY CAN

Desmond Brothers, the makers of Deft Wood Finish, announce a Deft 16-ounce aerosol spray can. Deft spray can application is recommended for touch-up and for small furniture pieces where brushing is difficult, such as, turned legs, carved details, picture frames,

Deft Wood Finish in a Spray Can

shutters, drawer interiors, drawer slides, and window runners, etc. Deft spray can also simplifies the application of a Deft protective coating on interior brass hardware, trophies, metal planters, etc.

Deft Wood Finish is also available in regular containers from 55-gallon drums to half pints.

Deft is the complete interior wood finish in one can. It seals, primes, finishes. Nothing else to use from raw wood to bar-top finish. Deft does not darken, will not skin in the can, and is completely trouble-free.

(For further details encircle index code 0610)

(Continued on next page)

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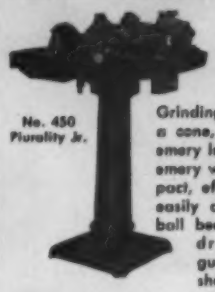

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SHOP EQUIPMENT NEWS

(Continued from previous page)

KODAK HIGH SPEED EKTACHROME FILM

Eastman Kodak Company recently announced a new high speed color film which represents an important advance in film emulsion technology. The film with its ASA rating of 160, is five times faster than previous products of the same type.

The new emulsion is of the transparency type that produces color slides for projection purposes. Known as Kodak High Speed Ektachrome Film it is meant to help both amateur and professional photographers shoot slides at faster speeds and in less light than ever before.

Samples of the new film taken in existing light under conditions where supplementary flash or flood illumination would have previously been necessary were shown by the company.

In addition to its speed the new film also has remarkably fine qualities of definition, grain, and color rendition. It will be available in June in 20-exposure magazines for 35mm. cameras.

Kodak High Speed Ektachrome will be offered in two types. Daylight Type is balanced for exposure in sunlight and has an exposure index of 160. Type B, balanced for artificial lamps, has an index of 100 used without a filter in the light of 3200 K tungsten lamps.

The daylight type may be used for flash shots with blue bulbs or electronic flash. Type B may be used with clear flash lamps with a filter such as the Kodak Light Balancing Filter No. 81C.

The new film is primarily for special purposes requiring an ultra-sensitive emulsion. Kodachrome and Kodak Ektachrome Films will continue to be mainstays in normal picture-taking situations. The new film is not recommended for use in non-adjustable cameras.

Additional information is available upon request.

(For further details encircle index code 0611)

"NEW DIMENSIONS IN MECHANICAL DRAWING"

Eugene Dietzgen Company offers a stimulating series of easy-to-make geometric models for mechanical drawing instructors and for college industrial arts students. This series is called "New Dimensions in Mechanical Drawing." Each model not only stimulates an awareness of the mathematics involved, but also encourages mechanical skill. The series helps the student to better understand and visualize the development of three dimensional models by actually putting them together. In fact, the idea was born in a classroom where student interest was both spontaneous and sustained.

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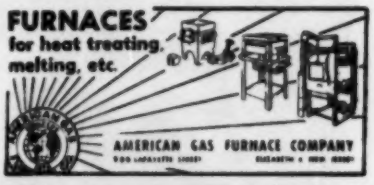

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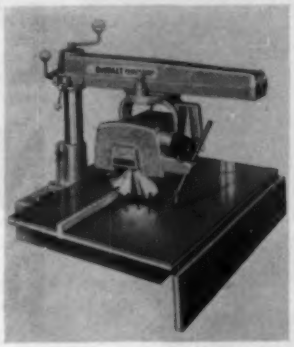
to students and instructors in more than 100 colleges. Educators have responded enthusiastically. The models are easy to assemble and require no special equipment. Beginning with such simple forms as the tetrahedron and octahedron, the series will include progressively more complicated forms.

Past copies of the models as well as future models may be obtained by any instructor or industrial-arts student by requesting them on school stationery.

(For further details encircle index code 0612)

NEW MODEL "925" DeWALT "POWER SHOP"

DeWalt Division of American Machine & Foundry Company has announced the introduction of its new model "925" "Power Shop." The machine replaces a previous model MBF, and incorporates more than 15 major design changes which offer the user increased power, safety, and operating versatility.



New Model "925" DeWalt "Power Shop"

The "925" model is powered by the first totally enclosed direct drive motor introduced on any bench-type home power tool, and provides more than 2-h.p. at the cutting spindle. An exclusive flat-bottom designed motor which operates on 120-240 volts, permits the use of only a 9-in. blade to give a 2.5-in. depth of cut, thereby maintaining professional capacity with a smaller, safer blade. Because of a larger yoke design, the motor can be tilted a full 350 deg., adding greatly to operating versatility.

In addition to increased power, the "925" model offers safety features including: the first instant-acting built-in electro-mechanical brake that stops a 9-in. blade five seconds after shut-off; a drop-leaf table upfront which eliminates saw overhang on wide cross-cuts and ripping operations; cut-off scale which eliminates the need for marking stock when cross-cutting; a cam-type starting key switch which actuates in any direction, and can be removed only when the power is shut off; all operating controls located above the working table, making it easier and safer for the operator to set up; a redesigned safety guard equipped with over-sized wing clamp to facilitate positive setting at any angle; specially designed table frame for increased rigidity for the new Weldwood Lebanex table top; and many other design changes that make operation easier and safer.

More information may be obtained.

(For further details encircle index code 0613)

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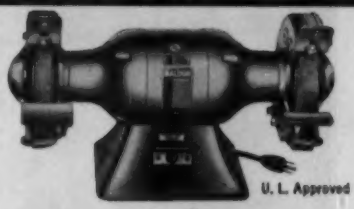

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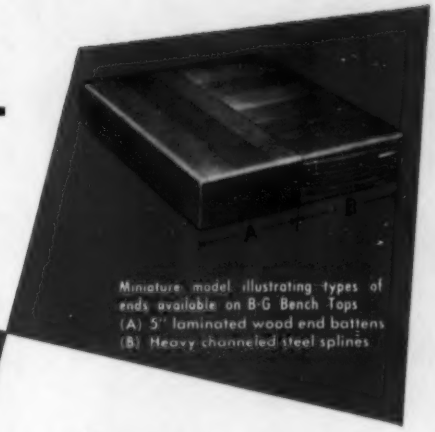

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